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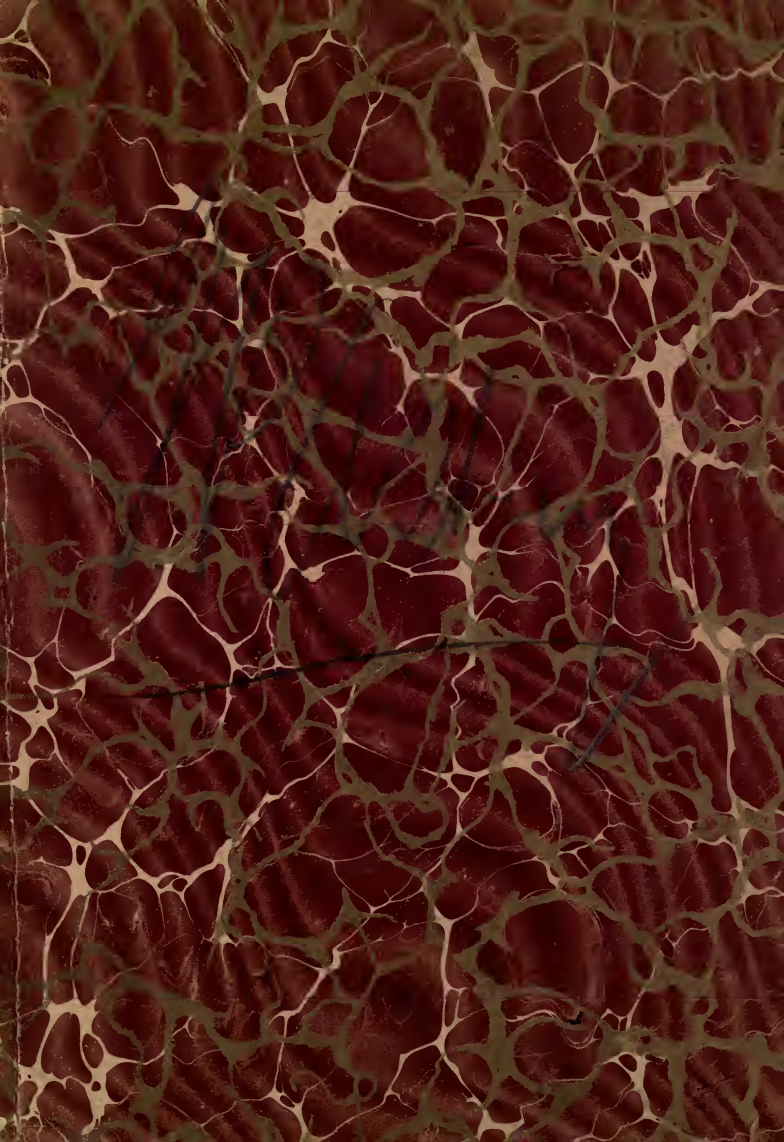
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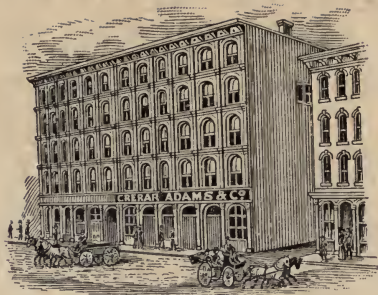
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1914

PRICE LIST.

CRERAR, ADAMS & CO.

CHICAGO.

GREAT WESTERN RAILROAD PLOWS.

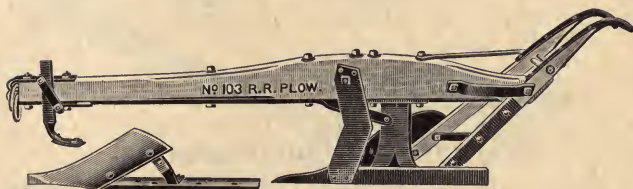


Fig. D. 1.

The standard, mould-board and point are made of extra quality of wrought steel. The mould-board and point are both *double shinned*. The handles and beam are of the best second-growth, hard wood lumber, with handholds solid steel. Plows Nos. 101 and 103 are also provided with a heavy improved steel shoe, or runner, upon the side, to protect the handles when the plow is dragging. Made right or left hand. Are provided with *best reversible steel cutters*.

The principal strain is carried by heavy steel draft rod, underneath the beam and the entire plow is constructed to stand the *very hardest usage*. They cut 12 inches with *light draft*.

Prices include one extra point.

No.	Horse-Power.	Weight.	Price.
101.....	6 to 8	228 lbs.	\$38 00
103.....	12 to 14	280 lbs.	45 00

Discount.....

GREAT WESTERN RAILROAD PLOWS.



Fig. D. 2.

No.	Horse-Power.	Weight.	Price.
105.....	4 to 6	175 lbs.	\$30 00
106.....	2 to 4	135 lbs.	25 00

Discount.....

RAILROAD OR GRADING PLOW.

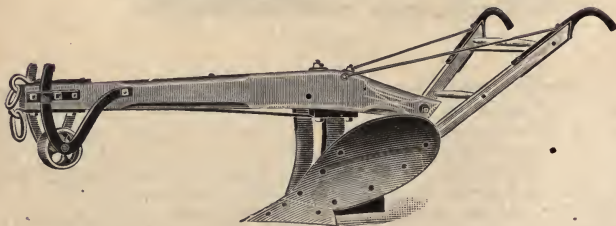


Fig. D. 3.

This plow is made to cut a deep, rather than a wide furrow, and can be regulated to cut almost any depth required. It does not turn the soil over, but loosens it leaving the trash on top, so that it will not interfere with the scraper when filling.

Owing to the peculiar shape of the mould-board, this Plow can be drawn easily by two horses, but is strong enough for heavier work where six horses are required.

Also furnished with heavy Steel Gauge Shoe, in place of Gauge Wheel when so ordered.

No. 3, Left Hand, weight	200 lbs.....	\$22 50
No. 13, Right	200 lbs.....	22 50

Discount.....

HARD PAN PLOW OR POWER PICKS.

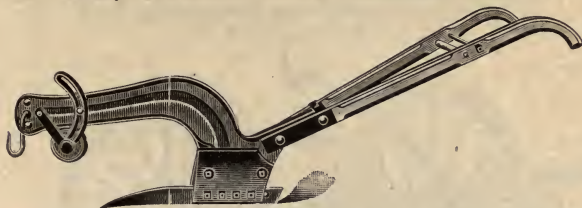


Fig. D. 4.

The points are made of the best tool steel, and two are furnished with each Plow, so that while one is being sharpened by a blacksmith the other can be in use. They are sharpened the same as a pick.

Plow, with Guide-Wheel, for two teams.....\$50 00
single team..... 45 00

Discount.....

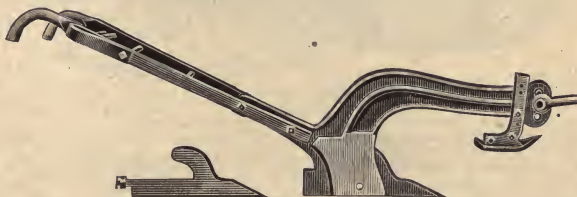


Fig. D. 5.

Heavy steel point. Will stand hardest of usage. The nose is adjustable; is fitted with gauge shoe, oak handles and braced for work intended. Clevis, wrench and one extra point included at list price.

Price.....\$50 00

Discount.....



Fig. D. 6.

Double reversible tool steel point. Adjustable shoe in place of wheel, Loop handle wear irons. Strongly built throughout.

For two or three teams. Price.....\$50 00

Discount.....

The above Plows will tear up hard-pan, soft shaly rock, soft sandstone, cobble streets, and anything too hard for an ordinary plow to break up, and not quite hard enough for blasting. Two teams will plow up the hardest street with ease.

“K. & J.” PRESSED BOWL WHEEL SCRAPER.
 With Improved Sand-Proof Malleable Iron Hubs.
 Eastern Pattern.

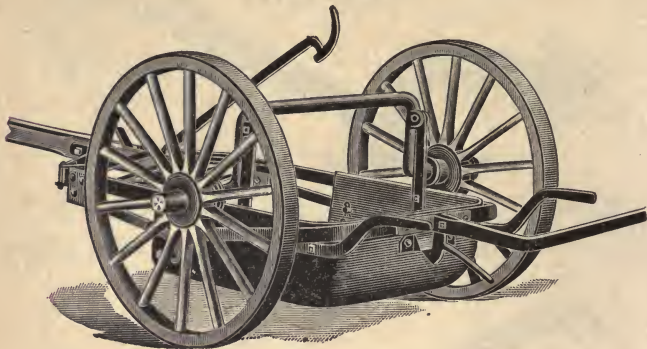


Fig. D. 7.

The Pressed Bowl Wheel Scrapers have the bowl stamped from one plate of heavy high carbon steel, without joint, seam or rivet. The axle, tongue braces or bail, cross-truss, lever, and hangers are all of the best steel.

These Scrapers have no castings to break, no ratchets to clog up. They are so constructed that the team does most of the lifting, and one man can fill, raise and dump the largest size with ease. They are so hung that there is no strain whatever on the horses' necks.

We furnish Wheel Scrapers with improved “K. & J.” wheels, having malleable iron hubs.

No. 1, Capacity 9 cubic feet	Price, \$45 00
“ 2, “ 13 “ “	“ 50 00
“ 3, “ 17 “ “	“ 55 00
Discount.....	

AUTOMATIC FRONT END GATE.
 For “K. & J.” Wheel Scrapers.



Fig. D. 8.

When Scraper is lowered to fill, the axle arms raise the End Gate up, and when Scraper is loaded and lifted into carrying position, the gate falls with its own weight, closing the front of Scraper.

When Scrapers are working on long or down hill hauls or in gravelly or buckshot material, it will save from three to four feet every load.

Price.....	\$5 00
Discount.....	

When ordering, specify whether for No. 1, 2 or 3 Scraper.

"K. & J." SQUARE BOX WHEEL SCRAPERS.

With Malleable Iron Hub Wheels.

Western Pattern.

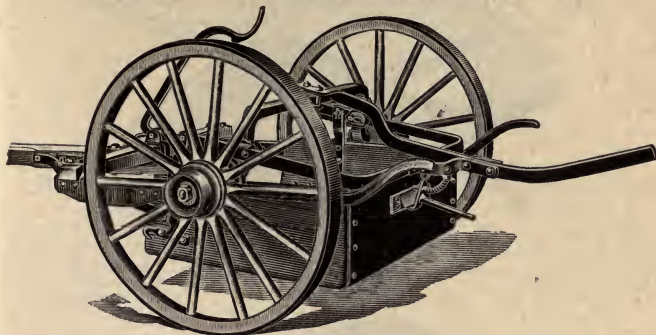


Fig. D. 9.

All material and workmanship entering into the construction of these scrapers is first-class.

These scrapers are superior in design and operation to any other wheel scrapers manufactured, our "K. & J." Pressed Bowl Scraper alone excepted.

No. 1	—Capacity	9 cubic feet	.....	Price	\$40 00
" 2	—	12 " "	.....	"	45 00
" 2½	—	14 " "	.....	"	47 50
" 3	—	16 " "	.....	"	50 00

Discount.....

WHIFFLETREES AND NECK YOKES.

Doubletree 43 inches long by 2½x4½ inches. Heavy double clips.

Singletrees, 32 inches long by 1½x2½ inches.

Neck Yoke, 40 inches long by 2½ inches in diameter.

Price per set complete as above.....\$6 00

Discount.....

Whiffletrees and Neck Yokes are never furnished with Wheel Scrapers unless specially ordered, and are always charged extra.

THE "COLUMBUS" SOLID STEEL SCRAPER.

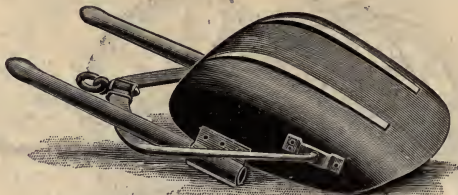


Fig. D. 10.
With Runners.



Fig. D. 11.
With Double Bottom.

The "Columbus" Steel Scraper is made of heavy high carbon steel, pressed with one continuous curve, from the center up the sides and back, without joint or seam.

We ship always without runners, unless otherwise directed.

No. 1. Carries 7 feet of earth. Size of bowl: Top of back to cutting edge, 34 inches; width, 33 inches; depth, 10 inches; weight 109 pounds.		
Price.....	\$13 00	
No. 2. Carries 5 feet of earth. Size of bowl: Top of back to cutting edge, 31½ inches; width, 29½ inches; depth, 9½ inches; weight, 89 pounds.		
Price	12 00	
No. 3 "Columbus." Capacity, 3 cubic feet. Size of bowl: Top of back to cutting edge, 32 inches; width, 26 inches; greatest depth, 9½ inches; weight, 75 pounds. Price.....		
	11 00	
With runners.....	extra	50
With double bottom.....	"	1 00

Discount.....

THE "BOSS" SOLID STEEL DRAG SCRAPER.

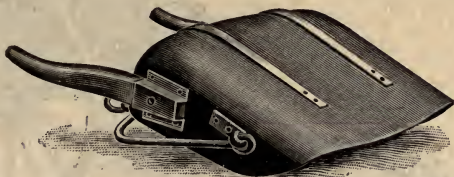


Fig. D. 12.

With or without runners or double bottoms. Dimensions same as the "Columbus."

No. 1.	Capacity, 7 cubic feet; weight, 94 pounds.....	each, \$11 00
No. 2.	Capacity, 5 cubic feet; weight, 82 pounds.....	" 10 00
No. 3.	Capacity, 3 cubic feet; weight, 68 pounds.....	" 9 00
With Runners.....	each extra	50
With Double Bottom.....		1 00

Discount.....

THE "K. & J." SQUARE BACK DRAG SCRAPER.

Style A.

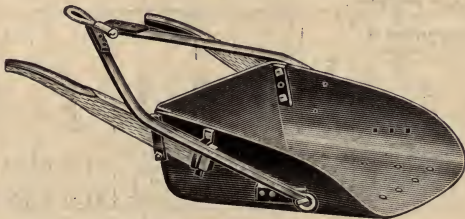


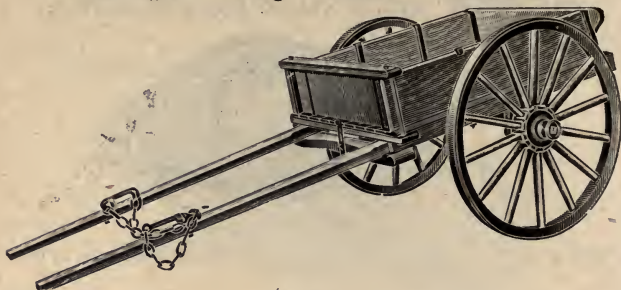
Fig. D. 13.

Made from a single sheet of steel, formed cold. Extra heavy bail, double at center to form swivel bearing, extra bar being heavily riveted to bail. Carefully selected material throughout, carefully manufactured.

The Style "A" Square Back Drag is furnished only with extra-heavy pressed steel double bottom. The front of the bottom plate is ground to a blade edge the same as the scraper cutting edge. The rivets attaching it are through the flanges so that all rivet heads are protected from wear.

No. 1.	Capacity, 5½ cubic feet; approximate weight 105 pounds....	each, \$13 00
No. 2.	Capacity, 4½ cubic feet; approximate weight 95 pounds....	12 00

Discount.....

CONTRACTORS' LIGHT AND HEAVY DUMP CARTS.**Dirt Tight. Strong. Durable. Substantial.****Fig. D. 14.**

Especially adapted to the hardest kind of usage in handling rock, gravel, clay and other heavy material. Made throughout of hardwood lumber, strongly braced and bolted.

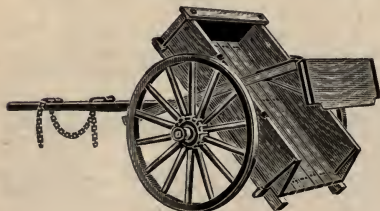
Bed has two heavy sills with heavy cross piece at rear end. Front end board has cross piece on top bolted down through the sill, the bolts firmly binding together the front end of the bed. Each side board is firmly secured to the side sill by three heavy anchor bolts on the inside. The side boards have heavy iron straps along the upper edges. The rear end of the sides and the tail gate are heavily iron braced.

The wheels are set to standard wide tread, 5 feet 2 inches. They are also provided with Sand Proof Malleable Hub Wheel.

The carts are painted Venetian red. They are provided with all the necessary chains and hooks as shown.

Cart.	Dimensions of Bed Inside.			Diameter Wheels.	Size Tires.	No. Spokes.	Size Spindle.	Capacity.	Approximate Weight.	Price, Each.
	Length.	Width.	Depth.							
Heavy	66 in.	44 in.	13 in.	54 in.	3 x 1/4 in.	14	10 x 2 1/4 in. Taper	24 cu. ft.	934 lbs.	\$63 00
Light	66 in.	44 in.	12 in.	54 in.	3 x 1/4 in.	14	10 x 2 in. Taper	21 cu. ft.	705 lbs.	57 50

Discount.....

**Fig. D. 15.****Cart Showing Position Dumped.****CONTRACTORS' DUMP CART.****With Patent Automatic End-Gate Attachment.**

Same dimensions as carts shown above.

Weight.....715 lbs.

Price, each..... \$75 00

Discount.....

WALL TENTS.



Fig. D. 16.

Size, Feet.	Height of Pole, Feet.	Height of Wall, Feet.	8 oz. Duck, Single Filling.	10 oz. Duck, Single Filling.	10 oz. Duck, Double and Twisted Filling, or 8 oz. Army Duck.	12 oz. Duck, Double and Twisted Filling, or 10 oz. Army Duck.
7 x 7...	7	3	\$ 8 00	\$ 9 35	\$10 35	\$12 25
7 x 9...	7	3	9 50	11 05	12 30	14 60
9 x 9...	7½	3	10 95	12 80	14 30	17 00
9½ x 12...	7½	3	12 90	15 05	16 80	19 95
9½ x 14...	7½	3	14 65	17 10	19 10	22 65
12 x 12...	8	3½	15 30	17 95	20 00	23 75
12 x 14...	8	3½	17 30	20 20	22 55	26 80
12 x 16...	8	3½	19 20	22 45	25 05	29 80
12 x 18...	8	3½	21 35	24 95	27 80	33 00
14 x 14...	9	4	20 60	24 15	26 95	32 10
14 x 16...	9	4	22 70	26 65	29 80	35 50
14 x 18...	9	4	25 35	29 75	33 20	39 45
14 x 20...	9	4	28 20	32 75	36 40	43 00
14 x 24...	9	4	31 80	36 90	41 00	48 10
16 x 16...	11	5	28 20	33 20	37 15	44 10
16 x 18...	11	5	30 95	36 40	40 75	48 25
16 x 20...	11	5	34 10	39 80	44 30	52 15
16 x 24...	11	5	38 85	45 20	50 25	59 05
16 x 30...	11	5	47 00	54 75	60 85	71 50
16 x 35...	11	5	52 60	61 30	68 10	80 20
18 x 18...	11	5	35 40	41 60	46 45	55 20
18 x 20...	11	5	39 00	45 45	50 50	59 70
18 x 24...	11	5	43 60	50 85	56 50	66 50
18 x 30...	11	5	52 25	60 90	67 75	79 95
18 x 35...	11	5	58 15	67 80	75 40	89 05

Add 5 per cent to above prices for each addition of 6 inches to height of wall, or part thereof.

Hand Sewed Tents, 12½ per cent advance on above

Discount.....

K. & J. "BOSS" BARROW.



Fig. D. 17.

With Jacobs' Patent No. 2 Wood Wheel, weight 648 lbs.	per doz.	\$24 00
With Lewis' 13X Patent Steel Wheel, weight 684 lbs.	"	26 00

Discount

"SCIOTO" RAILROAD OR CANAL BARROW.

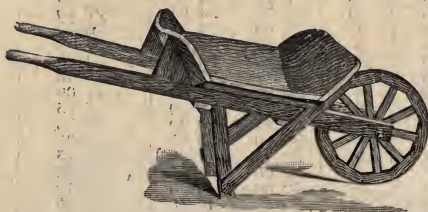


Fig. D. 18.

With Jacobs' Patent No. 2 Wood Wheel, weight 578 lbs.	per doz.	\$21 00
With Lewis' 13X Patent Steel Wheel, weight 614 lbs.	"	23 00

Discount

MORTAR BARROW.

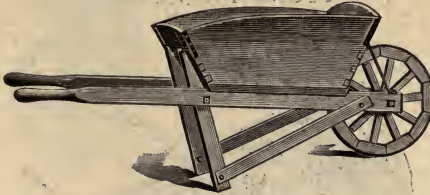


Fig. D. 19.

For ore, coal, mortar, sand or dirt. All hard wood. The sides and end pieces of the bowl are dovetailed together. Capacity, $3\frac{1}{4}$ cubic feet.
 Size of tray 10 inches deep at handles and 13 inches at wheel; bottom $19\frac{1}{2}$ inches square; top, 27 inches wide by 29 inches long. Edges of tray iron strapped. Weight, 58 lbs. each.

With Jacobs' Patent No. 2 Wood Wheel per doz., \$34 00
 With Lewis' 13X Patent Steel Wheel..... " 36 00

Discount.....

WHARF BARROW.

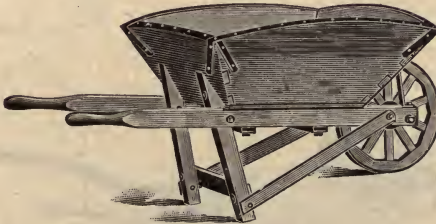


Fig. D. 20.

Sides and end pieces of tray dovetailed together, iron strapped and firmly nailed. Thoroughly braced and bolted. Tray iron strapped on top.

Size of tray: 12 inches deep at handles and 16 inches at wheel; bottom 17 inches wide by 18 inches long; top, 32 inches wide by 33 inches long.

Weight, 66 lbs. each.

With Jacobs' Patent No. 5 Wood Wheel..... per doz. \$36 00
 With Lewis' 13X Patent Steel Wheel..... " 38 00

Discount.....

STONE BARROWS.

Bent Handle.

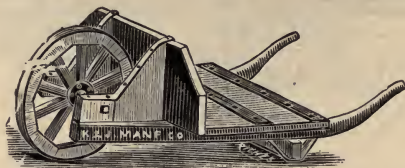


Fig. D. 21.

Bent handles. Thoroughly bolted. Well ironed.

Handles, 6 feet long. Cross piece at legs, 2x3 inches. Bottom. 1½ inches thick by 26 inches wide by 27 inches long. Dash 11 inches high.

With Jacobs' No. 6 Patent Wood Wheel, weight 76 lbs. each, per doz. \$40 00

With Lewis' No. 15 Steel Spoke Wheel, weight 77 lbs. each. " 43 00

Discount.....

Steel Bottom.

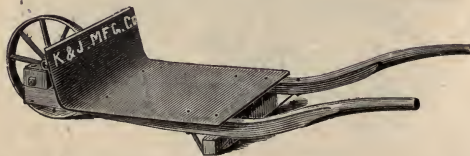


Fig. D. 22.

For stone or pig metal. Bottom 26 inches wide, 27 inches long Dash 9 inches high, formed of one plate of steel ½-inch thick.

Diameter of wheel, 16½ inches; tire, 1¼x½ inches. Weight 100 lbs. each.

Per dozen.....\$70 00

Discount.....

OPEN BOTTOM BRICK BARROW.

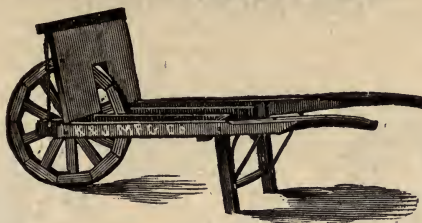


Fig. D. 23.

With Jacobs' Patent Wheel.

This Barrow is designed for use at brick yards, and especially for handling green brick.

¹Diameter of wheel, 19 inches; width of tire, $1\frac{1}{4}$ inches.

With Jacobs' Patent Wood Wheel, weight 55 lbs. each.....Per doz., \$45 00

With Steel Spoke Wheel, weight 58 lbs. each.....47 00

Discount.....

Fig. D. 24.
Steel Wheel.JACOBS'
PATENT
WHEELS.Fig. D. 25.
Wood Wheel.

Wood Wheels.

Kind.	Diam.	Tire.	Spokes.	Hub.	Axle.	Weight.	Price, Doz.
No. 2	17 in.	$1\frac{1}{4} \times \frac{1}{8}$	$1 \times \frac{1}{4}$	6 in. long	$\frac{1}{2}$ in.	9 lbs.	\$ 8 50
No. 3	19 in.	$1\frac{1}{4} \times \frac{1}{8}$	1×1	6 in. long	$\frac{3}{4}$ in.	11 lbs.	10 50
No. 4	21 in.	$1\frac{1}{4} \times \frac{1}{8}$	$1\frac{1}{2} \times 1$	$7\frac{1}{2}$ in. long	$\frac{3}{4}$ in.	17 lbs.	15 50
No. 5	17 in.	$1\frac{1}{2} \times \frac{1}{8}$	1×1	6 in. long	$\frac{3}{4}$ in.	11 lbs.	9 00
No. 6	17 in.	$1\frac{1}{2} \times \frac{1}{8}$	$1\frac{1}{2} \times 1$	$7\frac{1}{2}$ in. long	$\frac{3}{4}$ in.	15 lbs.	11 50
No. 7	19 in.	$1\frac{1}{2} \times \frac{1}{8}$	$1\frac{1}{2} \times 1$	$7\frac{1}{2}$ in. long	$\frac{3}{4}$ in.	16 lbs.	13 00

Lewis Steel Spoke Wheels.

Round Steel Spokes.

Wrought Iron Tire.

Malleable Iron Hub.

The spokes cannot be loosened or tire come off.

Kind.	Diam.	Tire.	Spokes.	Hub.	Axle.	Weight.	Price, Doz.
No. 13	$16\frac{1}{2}$ in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	9 lbs.	\$ 8 50
No. 13-X	$16\frac{1}{2}$ in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	12 lbs.	11 00
No. 13-A	$16\frac{1}{2}$ in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	12 lbs.	11 50
No. 14	$16\frac{1}{2}$ in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	14 lbs.	12 00
No. 15	$16\frac{1}{2}$ in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	16 lbs.	14 00
No. 15-X	19 in.	$1\frac{1}{2} \times \frac{1}{4}$	$\frac{3}{4}$ Rd.	6 in. long	$\frac{1}{2}$ in.	19 lbs.	14 50

Discount.....

TRACKBARROW WHEELS.

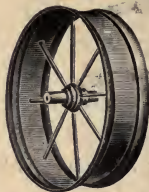


Fig. D. 26.
Flanged Wheel.

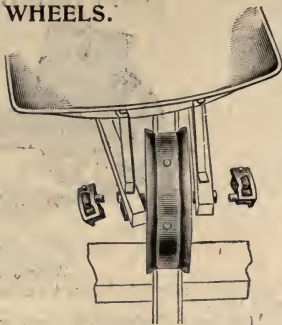


Fig. D. 27.
Showing Axle Bearing Device.

Trackbarrows can be quickly made of any wooden or steel tray barrow, by using this axle bearing device. The wheel is adjustable to either of these positions; straight with handles, right oblique or left oblique. The man walks astride the rail or just inside either rail. The loaded barrow balances nicely in either position, and runs so easily that maximum loads can be handled as fast as a man can work.

Flanges have turned rims about $\frac{1}{4}$ inch wide, so that wheel may be used off the rail.

The axle bearings are of malleable iron. Can't work loose, and maintain a fixed axle. Wheel must run evenly and true.

The lower cut shows a regular track barrow made in a few minutes by equipping a common steel tray barrow with our track barrow wheel and axle bearing device.

Diam. over All	Depth of Flanges	Dist. bet. Flanges	Thick- ness of Tire	Size of Spokes	Size of Axle	Hub Length	Weight of 1 doz. Wheels	Price, Each Wheel and Bearings
17 in.	$\frac{1}{2}$ in.	$3\frac{1}{2}$ in.	$\frac{1}{8}$ in.	$\frac{1}{2}$ in. rd.	$\frac{1}{2}$ in.	7 in.	180 lbs.	\$3 00

Discount.....

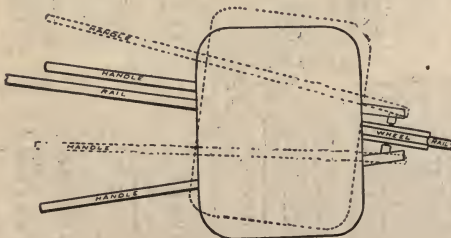


Fig. D. 28.

THE PAN-AMERICAN STEEL TRAY BARROW.

With Wood Legs.



Fig. D. 29.

The Tray of No. 15 steel, pressed from a single sheet.

The flange of tray is turned over a $\frac{1}{8}$ steel rod, which passes entirely around the tray preventing breaking, and stiffening and strengthening it.

Size of tray: Greatest length, 32 inches; greatest width, 33 inches; depth at wheel end, 11 inches; depth at handle end, $7\frac{1}{2}$ inches.

With Jacobs' Patent Wood Wheel, weight 684 lbs.....	per doz.	\$42 00
With Lewis' 13A Steel Wheel " 708 "	"	45 00

Discount.....

With Angle Iron Legs and Braces.

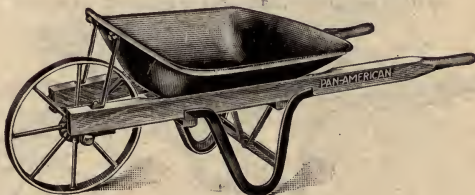


Fig. D. 30.

This wheelbarrow differs from the "Pan-American" wheelbarrow shown above only in being equipped with angle iron legs and braces. These legs are of heavy angle iron having an angle iron cross brace. An additional V-brace extends from the handles at each side and is bolted to the cross brace. A rigid under frame is formed in this manner which is unexcelled for strength and durability.

Approximate weights of barrows equipped in this manner; per dozen, 750 pounds; each 62½ pounds.

With Lewis' 13A Steel Wheel	Per doz.,	\$48 00
-----------------------------------	-----------	---------

Discount.....

STEEL TRAY BARROWS.



Fig. D. 31.

With Lewis' 13A Patent Steel Wheel.

No.	Length on Top, Inches.	Width on Top, Inches.	Depth at Wheel, Inches.	Depth at Handle, Inches.	Capacity, Cubic Feet.	Weight, Pounds. Each.	Price, Each.
1	32	29	7	5	3	53½	\$4 50
2	35½	28½	8½	6	4	59	5 50
3	41½	33	11½	8	6	66	6 50

No. 1 Trays, No. 17 steel; No. 2 Trays, No. 16 steel; No. 3 Trays, No. 15 steel. The flange of tray is turned over a $\frac{1}{8}$ steel rod, which passes entirely around tray.

Discount.....

With Improved Angle Iron Legs and Braces.

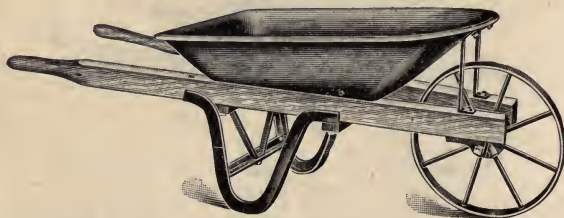


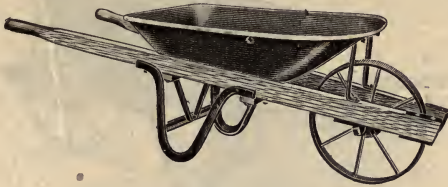
Fig. D 32.

Weight 60 pounds. Dimensions of tray and wheel same as shown above.

The Steel Tray Wheelbarrows are also supplied with angle iron legs and braces. These legs are cross braced with angle iron and are further re-enforced by a V-shaped steel brace which extends from the handles at each side and is bolted to the cross brace.

No. 1.	With Lewis' 13A Patent Steel Wheel.....	each,	\$4 75
No. 2.	With Lewis' 13A Patent Steel Wheel.....	"	5 75
No. 3.	With Lewis' 13A Patent Steel Wheel.....	"	6 75

Discount.....

CONTRACTORS' STEEL TRAY BARROWS.**With Improved Angle Iron Legs and Braces.****Fig. D. 33.****No. 2-A.**

Approximate weights: each, 69 pounds; per dozen, 828 pounds. Dimensions of tray and wheel same as No. 2 Steel Tray Barrow shown on page 16.

This wheelbarrow is similar to our No. 2 Steel Tray Wheelbarrow, with angle iron legs and braces, in every respect, except that the handles extend beyond the wheel to form rests upon which to tip the wheelbarrow. The handle extensions are provided with steel shoes. This wheelbarrow is very suitable for street work or for general purpose work of any kind.

Price, with Lewis' 13A Steel Wheel.....each, \$4 50

Discount.....

**Fig. D. 34.****No. 2-B.**

Approximate weights: each 73½ pounds; per dozen, 882 pounds. Dimensions of tray and wheel same as No. 2 Steel Tray Barrow shown on page 16.

This wheelbarrow is designed for handling dry concrete in street work, and all other work in which this material is used.

The construction of this wheelbarrow places the tray almost level when in a carrying position, and it is thus capable of containing a load of semi-liquid material nearly equal to the level capacity of the tray.

Also has the steel tipped handle extensions for dumping over the wheel.

The frame is very strongly built throughout and is equipped with angle iron legs and braces like the other type shown above.

Price, with Lewis' 13A Steel Wheel.....each, \$4 75

Discount.....

STEEL TRAY BARROW FOR CONCRETE.



Fig. D. 35.

Carrying capacity, 2 cubic feet of wet concrete. Will carry more liquid material than any other type of wheelbarrow on the market. Capacity of dirt, $\frac{4}{5}$ cubic feet.

Size of tray: Length, $37\frac{1}{2}$ inches; width, $25\frac{1}{2}$ inches; depth at front, 13 inches; depth at back, $8\frac{1}{2}$ inches; length of slope at front, $19\frac{1}{2}$ inches. Wheel diameter, $16\frac{1}{2}$ inches; size of tire, $1\frac{1}{2} \times \frac{1}{8}$ inches.

Approximate weights: each, $73\frac{1}{2}$ pounds; per dozen, 882 pounds.

With Lewis' No. 14 Steel Wheel.....each \$5 00

Discount.....

TUBULAR STEEL CONCRETE BARROW.

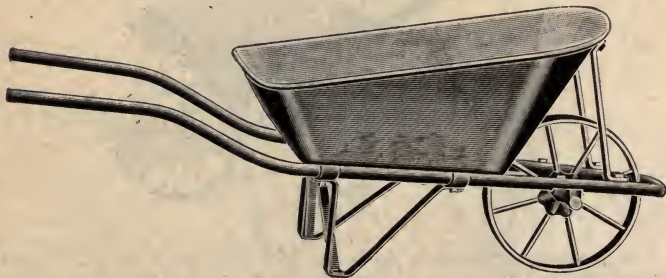


Fig. D. 36.

Capacity 2 cubic feet of wet concrete. Will carry more liquid matter than any other wheelbarrow on the market with the exception of type shown above. Capacity of dirt, 4 cubic feet.

Tray made of No. 15 steel. Length of tray, $37\frac{1}{2}$ inches. Width, $25\frac{1}{2}$ inches; depth at front, 13 inches; depth at back, $8\frac{1}{2}$ inches; length of slope at front, $19\frac{1}{2}$ inches. Wheel diameter, $16\frac{1}{2}$ inches. Tire, $1\frac{1}{2} \times \frac{1}{8}$ inches. Weight of wheelbarrow, 80 pounds.

With Lewis' No. 15 Steel Wheel.....each \$6 50

Discount.....

TUBULAR STEEL BARROWS.

Dirt Barrows.



Fig. D. 37.

No.	Gauge of Steel in Tray.	Length on Top.	Width on Top.	Depth at Wheel.	Depth at Handle.	Cubic Capacity.	Wght	Price Each.
4	15	32 in.	29 in.	7 in.	5 in.	3 ft.	75 lbs	\$10 75
4½	14	32 in.	29 in.	7 in.	5 in.	3 ft.	77 lbs	11 50
5	14	35½ in.	28½ in.	8½ in.	6 in.	4 ft.	79 lbs	13 50

Greatest length of all barrows, 67½ inches. Greatest width of all barrows is width on top of tray.

These barrows are intended for moving earth, sand, gravel etc.

No. 14 Lewis Steel Wheel used on above.

Mining and General Purpose Barrows.

No. 6—Tray made of No. 14 steel; size of tray same as No. 4; weight of barrow, 80 lbs.....Price, each, \$12 25

No. 7—Tray made of No. 14 steel; size of tray same as No. 5 (suitable for small coal barrow), weight of barrow 84 lbs.....Price, each, 14 25

These barrows have No. 15 Lewis Steel Wheels and extra strong legs and braces. They are intended for hard usage.

Discount.....

TUBULAR STEEL BARROWS.

Foundry Barrows.



Fig. D. 38.

No. 8—Tray made of No. 12 steel; size of tray same as Nos. 4 and 6,
weight of Barrow, 89 lbs.Price, each, \$14 00

No. 9—Tray made of No. 12 steel; size of tray same as Nos. 5 and 7;
weight of Barrow, 98 lbs.Price, each 16 00

Intended for wheeling castings, hot irons, etc., and for general foundry and
furnace use.

Discount.....

Pig Metal Barrows.



Fig. D. 39.

No. 13—Bottom $\frac{1}{4}$ -inch Steel, 23 inches long by 22 inches wide at handles
by $20\frac{1}{2}$ inches wide at Dash. The Dash is $20\frac{1}{2}$ inches wide, 13 inches
high.

Weight, 116 pounds. Price each.....\$18 00
For Pig Iron, Zinc, Tin, Lead etc.

No. 15 Lewis Steel Wheel used on above.

Discount.....

TUBULAR STEEL BARROWS.**Mining and Smelter Barrows.**Fig. D. 40.
No. 9X.

The Nos. 9-X and 17 are extra heavy types of mining or smelter barrows, and are made for the heaviest use.

The trays of both are stamped from No. 10 gauge plate and have rolled edges. These trays are heavily steel braced, the braces being bolted to the trays through strong re-enforcing bars.

Handles are of 1-inch pipe and are continuous, extending around in front of the wheel to form wheel guards.

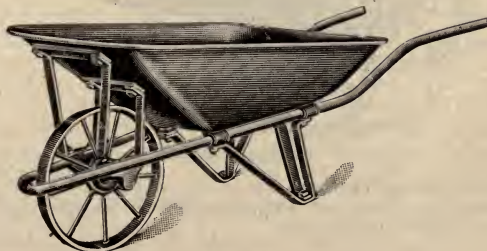
Legs and braces are extra heavy.

A special wheel is used on these barrows: diameter, $16\frac{1}{2}$ inches; size tire, $\frac{1}{2} \times 1\frac{1}{4}$ inches; 9 spokes $\frac{1}{2}$ -inch round; hub cast around spokes.

Wheels turn on $\frac{1}{2}$ -inch fixed axle bolts secured in malleable bearing clips firmly bolted under the handles.

Size No.	Gauge Steel in Tray.	Size of Tray.				Cubic Capacity.	Approximate Weight, Each.	Price, Each.
		Length on Top.	Width on Top.	Depth at Wheel.	Depth at Handle.			
9-X	No. 10	$35\frac{1}{2}$ in.	$28\frac{1}{2}$ in.	$8\frac{1}{2}$ in.	6 in.	4 cu. ft.	126 lbs.	\$25 00
17	No. 10	$41\frac{1}{2}$ in.	33 in.	$11\frac{1}{2}$ in.	8 in.	6 cu. ft.	151 lbs.	30 00

Discount.....

Fig. D. 41.
No. 14.

TUBULAR STEEL BARROWS.

Coal and Coke Barrows.



Fig. D. 42.

No. 10. Tray made of No. 13 steel; capacity, 425 lbs. of coal; greatest width of tray, 33 inches; weight of Barrow, 104 lbs.; price.....each, \$20 00

No. 12. Tray made of No. 15 steel; capacity, 5 bushels of coke or charcoal; greatest width of tray, 33 inches; weight of Barrow, 94 lbs.
Priceeach, 18 50

No. 12 Barrow is intended for carrying coke, charcoal, or other light material, and is not intended for use as a coal Barrow.

Discount.....

Two-Wheeled Coal Barrow.



Fig. D. 43.

Capacity, even full, $7\frac{1}{2}$ cubic feet.

Capacity even full nut coal, 400 lbs.; heaping full, 480 lbs.; lump coal, even full, 450 lbs.; heaping full, 650 lbs.

Price.....each, \$38 00

Discount.....

TUBULAR STEEL BARROWS. HOODED COAL OR COKE BARROW.

For Use in Gas and Coke Plants.

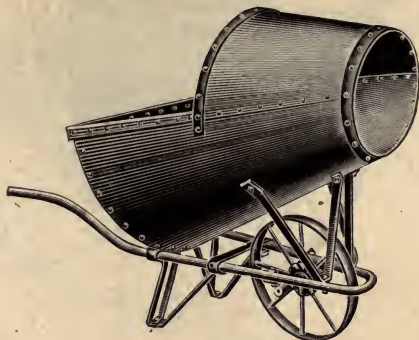


Fig. D. 44.

Capacity, 6½ Cubic Feet. Approximate Weight, 135 Pounds.

Is the only absolutely practical barrow of this type that has ever been produced. The frame is in construction independent of the tray, serving only as a rest on which the barrow is securely fastened. Other makes have the handles bolted to the side of the tray, throwing the weight of the load largely on handle bolts passing through the sheet steel of which it is constructed, thus allowing little use before the bolts loosen and tear out. This barrow has no handle strain on the tray but is built for hard usage. Another great advantage derived from this construction is the perfect leverage afforded by the position of the handles entirely beneath the weight of the load, making the barrow more easily handled and more easily dumped than any other.

The tray, including the hood, is formed from but three sheets of steel plate. The bottom plate consists of a single sheet of steel rolled into shape, to which the hood, formed in the same manner, is firmly riveted. The back is stamped with a flange through which it is riveted to the bottom plate. The tray rests in a forged angle at the back and is bolted in place, the extensions of the angle being bolted around the handles at both sides.

The handles are tubular iron, steel cross-braced and are continuous, passing around the front of the wheel and serving as a rest on which to tip the barrow.

Malleable iron bearings distribute the weight widely over the strong steel axle.

The well-known Lewis Tension and Torsion Steel Spoke Wheel is used in this barrow. The special style with broad, heavy tires, 2 inches x ¼-inch, which is furnished, is particularly adapted to the service required and in this fact is in accordance with every other feature of the barrow.

Price, each.....\$38 00

Discount.....

STEEL CHARGING BARROW.

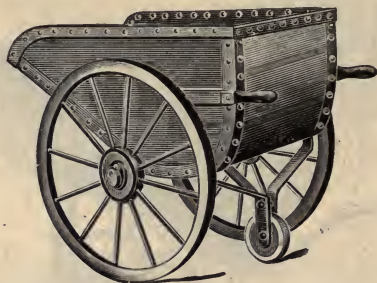


Fig. D. 45.

No.	Width Tray.	Length Tray.	Depth Tray.	Capacity Cubic Ft.	Weight, Lbs.	Price.
0	25½	44½	22	10	560	\$50 00
1	25	40	24	10	550	60 00
2	26	44	20	9½	385	36 00

No. 0. Bottom No. 10 Steel. Sides No. 12 Steel. Bottom re-enforced inside and mouth outside with No. 12 Steel. Wheels with plain bearings; heavy gray cast hub; diameter, 34 inches. Tire, 2½ inches by ¾-inch thick. Spokes ¾-inch round forged shoulders, fitted against inside of tire; ends extend through tire and are countersunk, riveted on outside.

No. 1. Bottom No. 10 Steel. Sides No. 12 Steel. Bottom re-enforced inside and mouth outside, same as the No. 0. Wheels have Steel Ball or anti-Friction Bearings, and wrought iron spokes (¾-inch round), with hub cast around spokes. Diameter of wheel, 34 inches, tire 2½ inches by ¾ inch.

No. 2. Bottom and Sides No. 12 Steel. Bottom re-enforced inside with No. 12 Steel, in same manner as the No. 0. Wheels, with plain bearings, 34 inches diameter; Tire 2x¾ inches; Spokes ¾ inches round. Cast Iron Hubs fastened on Axle by Washer and Cotter.

Discount.....

STEEL CONCRETE BARROW.

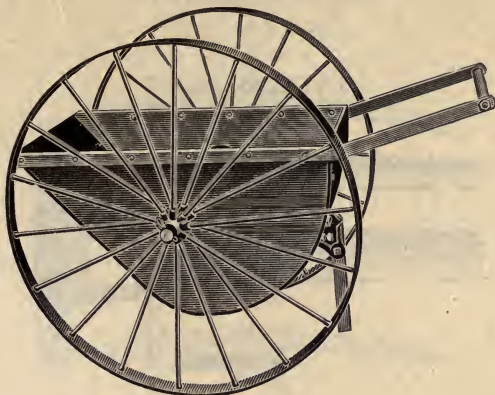


Fig. D. 46.

Capacity 6 Cubic Feet.

One man can push or pull this cart over a plank runway, even when the cart is level full of concrete, and transports from three to six times as much concrete as he could transport in a wheelbarrow.

There is an important economic advantage in being able to discharge the batch from a concrete mixer in much less time where carts are used than where wheelbarrows are used. A mixer can be discharged into these carts in one-third the time required with wheelbarrows.

The bottom and ends of the bowl are formed from one continuous sheet of steel. The sides are stamped with a flange and riveted to the bottom and ends. Heavy bands stiffen the edges, the side bands passing beyond the bowl to form the side bars of the handle. Protection for the lip of the bowl in dumping is afforded by the heavy rigid band which traverses it.

All weight is distributed well along the axle by cast iron axle bearings secured to the sides of the bowl.

Wheels are extra strong, having 18 staggered spokes of oval steel.

Cast leg bracket.

Size of Bowl.			Gauge Steel in Bowl.	Size Side Bands and Handles.	Size Front Band.	Size of Wheels.				Size of Axle.	Size of Leg.	Approximate Weight.	
Length at Top.	Width.	Depth at Center.				Diameter.	Size Tire.	Size of Spokes.	Number of Spokes.				Length of Hub.
38½ in.	20 in.	20 in.	No. 12	½ x 1 ½ in.	½x1 in.	42 in.	2 x ½ in.	¾x¾ in. Oval	18	5½	1½ in. Rd.	½ x 1 ¼ in.	240 Lbs.

Price, each.....\$30 00

Discount.....

EYELESS PICKS.

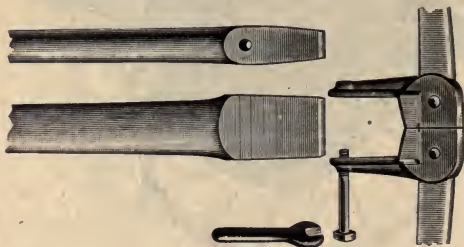


Fig. D. 47.

The EYELESS PICK is constructed of one solid bar of steel having a malleable iron socket at its centre, giving it the following advantages as compared with the eye pick:

1.—It enables the construction of a pick of a solid bar of steel and of such a grade of which it is impossible to construct an eye pick, *as such a pick must necessarily be made of a softer material in order to draw the eye.*

2.—By virtue of its construction and the grade of material entering into it, two most serious defects of the eye pick are obviated—namely, the frequent breaking of the eye and arm.

3.—Being made of one solid bar of steel, it requires no re-pointing, and when sharpening is necessary need only be drawn out. The Eyeless Pick in wear will outlast four re-steelings of the eye pick and can then be relaid.

4.—The handle is firmly secured to the pick by the bolt, but at the same time can be readily removed when necessary. A loose handle in a pick is a constant source of annoyance to the operator, who is frequently compelled to tighten it by wedging pieces of wood, spikes, etc., thus losing a great deal of time.

5.—The edge pieces of the Eyeless Pick extending along the sides of the handle for some distance, serve as a great protection to it.

EYELESS PICKS.

Railroad or Clay.

No 3.



Fig. D. 48.

Weight, each.....	5 lbs.	6 lbs.	7 lbs.	8 lbs.
Price, dozen.....	\$16 00	\$18 00	\$20 00	\$22 00

Discount.....

No. 4.



Fig. D. 49.

Weight, each.....	5 lbs.	6 lbs.	7 lbs.	8 lbs.
Price, dozen.....	\$16 00	\$18 00	\$20 00	\$22 00

Discount.....

No. 5.



Fig. D. 50.

Weight, each 7 lbs., per dozen.....	\$24 00
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Discount.....

No. 14.



Fig. D. 51.

Weight, each 7 lbs. per dozen.....	\$24 00
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Discount.....

PICKS.

Railroad or Clay.



Fig D. 52.

Adze Eye.

Weight.....	4 to 5 lbs.	5 to 6 lbs.	6 to 7 lbs.	7 to 8 lbs.	8 to 9 lbs.	9 to 10 lbs.
Price, dozen....	\$13 00	14 00	15 00	16 00	18 00	20 00

Discount.....

Ore Picks same price as above.

Verona No. 7, Solid Steel.....	per doz.,	\$10 00
" 17 " " Diamond Pointed.....		10 00

Discount.....

Poll Picks.



Fig. D. 53.

Nos.	1	2	3	4	5	6
Lbs.	3½	4	4½	5	6	7
Price, dozen ...	\$15 00	16 00	17 00	18 50	20 00	21 50

Discount.....

Tamping Picks.



Fig. D. 54.

Weight.....	6 to 7 lbs.	7 to 8 lbs.	8 to 9 lbs.	9 to 10 lbs.
Adze Eye, per doz.	\$18 00	19 00	20 00	21 00

Discount.....

Verona, No. 2, 7 to 8 lbs.....	per doz.,	\$12 00
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Discount.....

ADZES.



Fig. D. 55.

3½ to 4½ inch face..per doz.	\$24 00
5 to 5½ " " .. "	26 00
5½ to 6 " " .. "	27 00

Discount.....

GRUB HOES.



Fig. D. 56.

No. 0, Weight, 3 lbs..per doz.	\$12 50
" 1, " 3½ " .. "	13 00
" 2, " 4 " .. "	13 50
" 3 " 4½ " .. "	14 00

Discount.....

MATTOCKS.



Fig. D. 57.

*Adze Eye, Long Cutter, 6 lbs.	
Per dozen.....	\$17 00
Adze Eye, Long Cutter, 5 lbs.	
Per dozen.....	16 00

Discount.....

*6-lb. Mattocks sent unless otherwise specified.

PICK MATTOCKS.



Fig. D. 58.

Average weight.	
6 lbs.....per doz.,	\$17 00
5 lbs....."	16 00

Discount.....

SPIKE MAULS.



Fig. D. 59.

Per lb. 30c

Discount

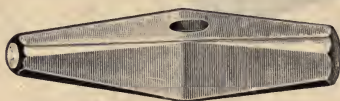


Fig. D. 60.

Per lb. 30c

Discount

TRACK CHISEL.



Fig. D. 61.

Weight, 4 to 5 lbs. Per lb. 40c

Discount

TRACK PUNCHES.



Fig. D. 62.

Weight, 4 to 5 lbs. Per lb. 40c

Discount

COLD CUTTING CHISEL.

Fig. D. 63.

Per lb.....42c

Discount.....

CAPE CHISEL.

Fig. D. 64.

Per lb.....45c

Discount.....

HAND CHIPPING CHISEL.

Fig. D. 65.

Per lb.....38c

Discount.....

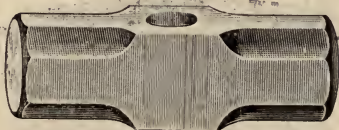
DOUBLE FACED STRIKING SLEDGES.

Fig. D. 66

5 lbs. and over..... per lb., 30c
 3 to 5 lbs..... per lb., 40c
 Under 3 lbs..... per lb., 50c

Discount.....

BLACKSMITHS' SLEDGES.
Straight or Cross Pein.

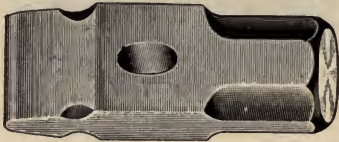


Fig. D. 67.

5 lbs. and over.....	per lb., 30c
3 to 5 lbs.....	per lb., 40c
Discount.....	

STONE SLEDGE HAMMERS.
Straight or Cross Pein.

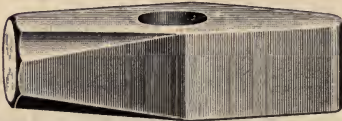


Fig. D. 68.

5 lbs. and over.....	per lb., 30c
3 to 5 lbs.....	per lb., 40c
Discount.....	

DOUBLE FACED STRIKING HAMMERS.



Fig. D. 69.

5 lbs and over.....	per lb., 30c
3 to 5 lbs.....	per lb., 40c
Under 3 lbs.....	per lb., 50c
Discount.....	

NAPPING HAMMERS.

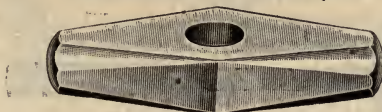


Fig. D. 70.

5 lbs. and over.....per lb., 30c
 3 to 5 lbs.....per lb., 40c

Discount.....

HAND DRILLING HAMMERS.

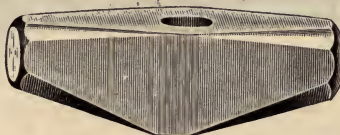


Fig. D. 71.

5 lbs. and over.....per lb., 40c
 3 to 5 lbs.....per lb., 50c

Discount.....

MASON HAMMERS.

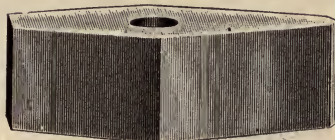


Fig. D. 72.

5 lbs. and over.....per lb., 50c
 3 to 5 lbs.....per lb., 55c

Discount.....

DOUBLE FACE STONE HAMMERS.



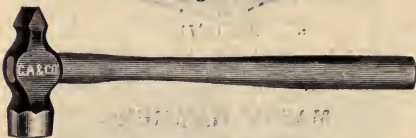
Fig. D. 73.

5 lbs. and over.....per lb., 40c
 3 to 5 lbs.....per lb., 50c

Discount.....

MACHINISTS' HAMMERS.

Handled.

Fig. D. 74.
Ball Pein.Fig. D. 75.
Straight Pein.Fig. D. 76.
Cross Pein.

No.	00	0	1	2	3	4	5	6	7	8
Weight, lbs. . . .	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3
Price, per doz. \$	12 00	12 50	13 50	14 50	15 50	16 50	17 50	19 00	20 50	22 00

Discount.....**BLACKSMITHS' HAND HAMMERS.**

Handled.

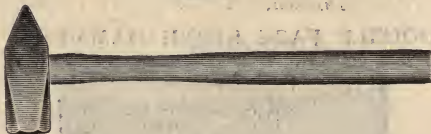


Fig. D. 77.

No.	0	1	2	3	4	5
Weight, lbs.	$1\frac{1}{4}$	2	$2\frac{1}{4}$	3	$3\frac{1}{2}$	$4\frac{1}{2}$
Price, per doz.	\$13 00	14 00	15 00	16 00	17 00	19 00

Discount.....
Weights do not include handle.

ENGINEERS' HAMMERS.

Handled.



Fig. D. 78.—Single Face.

No.	0	1	2	3	4	5	6
Weight, lbs.	1½	1¾	2	2½	3	3½	4½
Price, per doz.	\$12 00	13 00	14 00	15 00	16 00	17 00	19 00

Discount.....

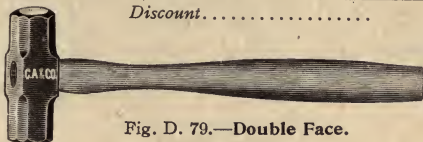


Fig. D. 79.—Double Face.

No.	1	2	3	4
Weight, lbs.	1½	2½	3	3½
Price, per doz.	\$14 50	16 50	18 00	19 50

Discount.....

CHIPPING HAMMERS.

Fig. D. 80.

No.	0	1	2	3	4
Weight, lbs.	1½	1½	2	2½	2¾
Price, per doz.	\$13 00	13 50	14 50	15 50	16 50

Discount.....

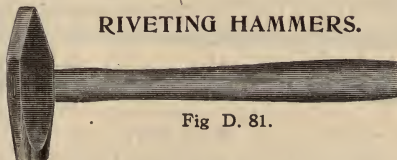
RIVETING HAMMERS.

Fig D. 81.

No.	1	2	3	4	5
Weight,	7 oz.	9 oz.	12 oz.	15 oz.	1½ lb.
Price, per doz.	\$5 75	6 00	6 25	6 50	7 00

Discount.....
Weights do not include handle.

AXES. **Single Bitted.**

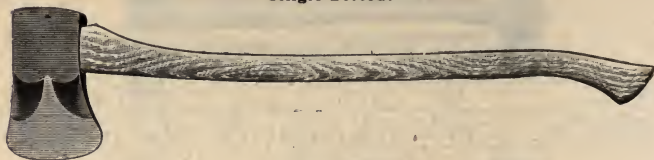


Fig. D. 82.

Handled, per doz.....	\$12 00
Without Handles, per doz.....	9 00

Discount.....

Double Bitted.

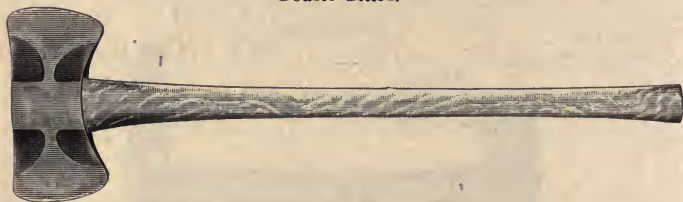


Fig. D. 83.

Double Bit Axes Handled, per doz.....	\$30 00
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Discount.....

Fireman's.

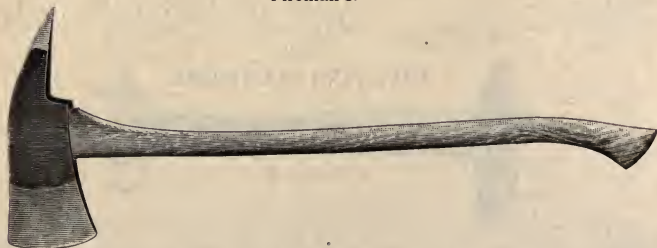


Fig. D. 84.

Fireman's Axes Handled, per doz.....	\$32 00
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Discount.....

BROAD AXES.



Fig. D. 85.

Nos.....	2	3	4	5	6	7
Cut—Inches.....	4½	5	5½	6	6½	7
Price, per doz....	\$11 50	13 00	14 50	16 50	18 00	19 50

Discount.....

HATCHETS.



Fig. D. 86.—Shingling.



Fig. D. 87.—Claw.

		Per doz.			Per doz.
No. 1, Shingling.....		\$8 00	No. 1, Claw		\$ 9 00
" 2, "		8 50	" 2, "		9 50
" 3, "		9 00	" 3, "		10 00

Discount.....

NAIL HAMMERS.

Handled.



Fig. D. 88.

Adze Eye.

Nos.....	0	1	1½	2	3
Weight.....	1 lb. 12 oz.	1 lb. 4 oz.	1 lb.	13 oz.	7 oz.
Price, per doz....	\$12 50	9 00	8 50	8 00	7 50

Discount.....

NAIL PULLER.



Fig. D. 89.

The "Never Slip."

Where the hook is set it sticks, the harder the pressure the more firmly. It also acts as a raised fulcrum, pulling the nails straight. It allows the curved surface (say of a nail keg) to enter between it and the jaws, thus making it easier to pull nails from a barrel or keg, than from flat surfaces with an ordinary puller. Price, per doz.....\$16 00

Discount.....

WATER KEGS.

Fig. D. 90.
Wood.Fig. D. 91.
Fibrotta.

For use in cars, shops and on track.

50	gallon, with cover, wood.....	each,	\$3 00
30	" " " "	"	2 50
20	" " " "	"	2 25
15	" " " "	"	2 00
10	" " " "	"	1 50
5	" " " "	"	1 25

Discount.....

15	gallon, with cover, fibrotta.....	each,	\$5 00
10	" " " "	"	4 00
6	" " " "	"	3 50
5	" " " "	"	3 00
4	" " " "	"	2 50

Discount.....

HANDLES.

List Feb. 1, 1908.

Turned Hickory Axe Handles.

	Calumet. (Extra)	Acorn. (No. 1)
Axe Handles—36, 34, 32 and 30-inch.....per doz.	\$9 80	\$4 90
“ “ Double bitted 30 to 36 inches.....“ “	9 80	4 90
Adze, House Carpenter, Ship and R.R., 36, 34 and 32-in “ “	10 10	5 60

*Discount.....***Turned Hickory Pick Handles.**

Surface or R. R., Mattock, and Miners'.	Calumet. (Extra)	Acorn. (No. 1)
Pick Handles—Surface or R.R., 36-inch.....per doz.	\$11 50	\$7 70
Drifting, 32, 34 and 36-inch.....“ “	9 80	4 90
Poll, 32, 34 and 36-inch.....“ “	9 80	4 90
Coal Miners' Small Eye.....“ “	7 90	3 60
“ “ Medium “.....“ “	7 90	3 60
“ “ Large “.....“ “	7 90	3 60
Grub Hoe Handles, 36-inch.....“ “	11 50	7 70

Hand Shaved Pick, add 80 cents per dozen to above prices.
 Large type indicates popular lengths.

*Discount.....***Turned Sledge, Tool and Maul Handles.**

Sledge, Tool or Maul Length.....	24-in.	26 & 28 inch.	30 & 32 inch.	34 & 36 inch.	38-in.	40-in.	42-in.
Calumet...per doz.	\$4 00	\$5 00	\$5 60	\$6 70	\$7 20	\$7 80	\$8 40
Acorn.....“ “	2 80	3 20	3 70	4 60	4 80	5 00	5 60

Hand Shaved Sledge, add 60 cents per dozen to above prices.

*Discount.....***Turned Hammer and Hatchet Handles.**

Length, Inches.....	11	12	13	14	15	16	17	18	19	20	22	24
Hammer...per doz.	\$1 60	1 60	1 60	1 60	1 60	1 75	1 75	2 00	2 25	2 25	2 50	2 80
Hatchet, broad or Bench...per doz.	.....	.....	.....	.....	.....	1 90	2 00	2 25	2 80	2 80	.....	.....
Hatchet, shingling “	.....	1 60	1 60	1 70	1 70	.....	.....	.....	.....	.....	.....	.....

Discount.....

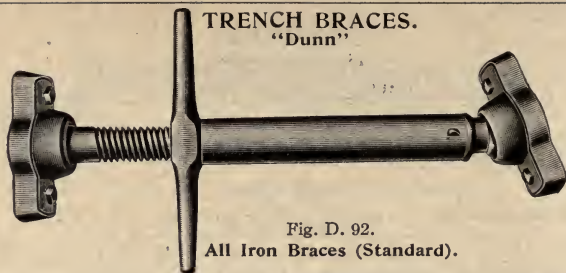


Fig. D. 92.

All Iron Braces (Standard).

With 1½-inch Screw and 1½-inch Pipe.				With 2-inch Screw and 2-inch Pipe. Extra Heavy Pattern.			
Length of Brace Closed.	Length of Screw.	Weight per Dozen.	Price per Dozen.	Length of Brace Closed.	Length of Screw.	Weight per Dozen.	Price per Dozen.
16 in.	11 in.	212 Lbs.	\$23 00	3 ft.	18 in.	542 Lbs.	\$51 00
18 in.	12 in.	220 "	23 00	3½ ft.	18 in.	564 "	52 00
21 in.	14 in.	240 "	24 00	4 ft.	18 in.	586 "	53 00
24 in.	14 in.	252 "	24 00	4½ ft.	18 in.	608 "	54 00
27 in.	16 in.	270 "	26 00	5 ft.	18 in.	630 "	55 00
30 in.	16 in.	280 "	26 00				
3 ft.	18 in.	300 "	27 00				
3½ ft.	18 in.	312 "	28 00				
4 ft.	18 in.	325 "	29 00				

Safety limit of extension 6 inches to 10 inches, according to length of brace.

Special sizes made to order. *Discount*.....

FITTINGS FOR COMBINED SCREW AND TIMBER BRACE.



Fig. D. 93.

This style of brace can be used in any width of trench from 2 to 30 feet. We do not furnish timbers.

Size of Screw.	Size of Cap or Washer Plate.	Weight per Dozen.	Price per Dozen.
1½ x 14 in.	4 x 4 in.	175 Lbs.	\$18 00
1½ x 14 in.	6 x 6 in.	200 "	20 00
1½ x 18 in.	6 x 6 in.	225 "	22 00
2 x 18 in.	6 x 6 in.	385 "	38 00
2 x 18 in.	8 x 8 in.	410 "	40 00
2 x 18 in.	10 x 10 in.	450 "	42 00
2 x 18 in.	9 x 12 in.	460 "	44 00

We can also furnish caps for the butt end of the brace.

Discount.....

TRENCH BRACES.

"Alliance" Extensible.
Rue's Patent.



Fig. D. 94.

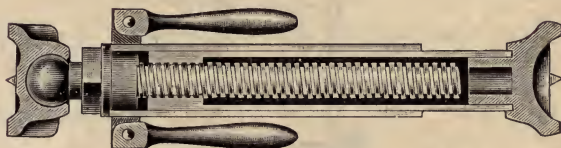


Fig. D. 95.

Single Strength.

1½-inch Pipe, 1½-inch Screw,
Extension, 10 inches.

Length Closed	Per Dozen Complete
16 inches.....	\$23 00
18 inches.....	24 00
24 inches.....	25 00
30 inches.....	27 00
36 inches.....	28 00

Double Strength.

2-inch Pipe, 1½-inch Shaft,
Threaded, 15 inches.

Length Closed	Per Dozen Complete
30 inches.....	\$50 00
36 inches.....	51 00
48 inches.....	53 00
60 inches.....	55 00
72 inches.....	57 00

Discount.....

Length given are over all and when closed. For all ordinary work the single strength brace is sufficiently strong. For heavier work the double strength brace should be used. Special lengths to order.

This brace has screws covered and protected from dirt and injury, with folding handles. All parts are interchangeable, longer or shorter barrels can be used, thus adapting it to any width of trench.

We can also furnish the Alliance Extensible Brace fittings for combined screw and timber brace (similar to Fig. D. 93 on preceding page). This style of brace is especially valuable in wide and deep trench and foundation work. It can also be used to good advantage in small trench work. We do not furnish timbers.

Size of Screw	Size of Cap	Per Dozen
1½ x 16 inches	4 x 4 inches	20 00
1½ x 16 inches	6 x 6 inches	26 00
1½ x 18 inches	6 x 6 inches	36 00
1½ x 18 inches	8 x 8 inches	40 00
1½ x 18 inches	10 x 10 inches	42 00

When required, we can also furnish caps for the butt end of brace. Unless otherwise stated in order, all orders will be filled with the single cap.

Discount.....

EARTH AUGER.

The Standard.

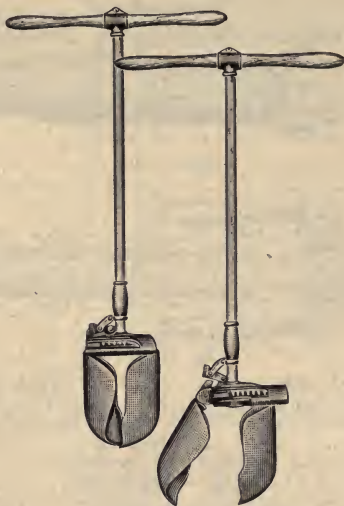


Fig. D. 96.

This Auger is constructed for all conditions of earth. Will enter hard earth with half the effort, and the double "V" point cutting blades saves half the time. Has an EXPANSION blade, which enables it to bore individually four, seven and nine different sized holes. It will also hold fine dry sand. Does not bind in the hole, and opens to discharge contents quickly.

Larger holes can be bored with the same auger, for concrete filling around posts, and is of great advantage in cement work.

No. 5.	Auger, boring four different sized holes, viz., 5, 6, 7 and 8 inches diameter, $3\frac{1}{2}$ feet deep	doz., \$39 00
No. 8.	Auger, boring seven different holes, 8 to 14 inches, inclusive.	" 42 00
No. 10.	Auger, boring nine different holes, 8 to 16 inches, inclusive.	" 48 00
No. 11.	Auger, boring nine different holes, 8 to 14 inches, inclusive.	" 60 00
No. 12.	Auger, boring nine different holes, 8 to 16 inches, inclusive.	" 66 00

Any of these Augers can be extended for deeper or shallow well boring by simply coupling on extra pipe.

Discount.....

POST AUGERS.



Fig. D 97.

4 5, 6 7, 8 or 9-inch.....per doz., \$18 00

Discount.....

Large Heavy Augers for Telegraph Poles.

10-inch, 5 foot handle	each, \$7 00	Extra Bottoms, 10-inch, each,	\$3 00
11 " 5 " " "	" 7 50	11 " " " "	3 50
12 " 5 " " "	" 8 00	12 " " " "	4 00
14 " 5 " " "	" 9 00	14 " " " "	5 00
Extra Handle, with top casting.....		each,	\$1 25

Discount.....

POST HOLE DIGGERS.

Eureka.

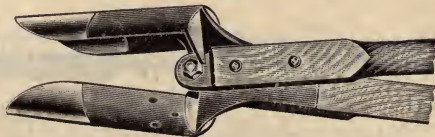


Fig. D 98.

Price.....per doz., \$15 00

Discount.....

Hercules.



Fig. D 99

Price.....per doz., \$15 00

Discount.....

DIGGING BARS.



Fig. D. 100.

Octagon Steel, 1 in. x 7 feet, 20 lb.....	each, \$2 50
" 1½ " x 8 " 30 lb.....	" 3 75

Discount.....



Fig. D. 101.

Octagon Steel, 1 in. x 7 feet, with tamper, 20 lb.....	each, \$2 60
" 1½ " x 8 " " " 30 lb.....	" 3 85
Round " 1 " x 7 " plain, 18 lb.....	" 1 80
" 1½ " x 8 " " 28 lb.....	" 2 80

Discount.....



Fig. D. 102.

Selected hickory handles, and steel blades.

Slick Digger, length 8 feet.....per doz., \$40 50

Discount.....

TAMPERS.

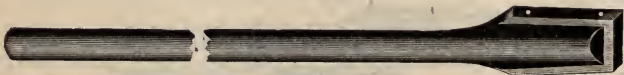


Fig. D. 103.

Forged steel shoes, selected hickory handles.

Length 8 feet.....	per doz. \$20 00
7 " W. U. pattern.....	" 30 00

Discount.....

PIKE POLES.

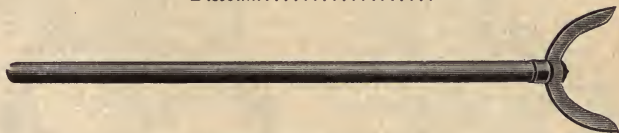


Fig. D. 104.

10 feet, best steel pike.....	per doz.,	\$18 00
12 " " " "	"	20 75
14 " " " "	"	25 50
16 " " " "	"	32 00
18 " " " "	"	42 00
20 " " " "	"	57 00

Handles, selected second growth Ohio white ash.

Discount.....



Fork and Socket one piece.

Fig. D. 105.

12 feet.....	per doz.,	\$22 00	16 feet.....	per doz.,	\$28 00
14 "	"	24 25	18 "	"	31 75

Discount.....

POLE SUPPORTS.

Selected hickory, heavily ironed and braced.

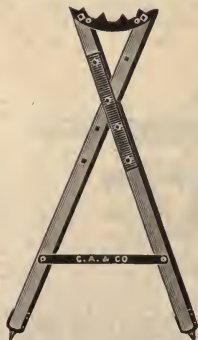


Fig. D. 106.

Jenney.

Jenney.

Height 6 feet.....	each.	\$6 25
" 7 "	"	7 00
" 8 "	"	8 25

Mule.

Height 6 feet	each,	\$5 00
" 7 "	"	5 75
" 8 "	"	7 00

Other sizes made to order.



Fig. D. 107.

Mule.

Discount.....

TIMBER GRAPPLES OR LUG HOOKS.

With Duck Bill or Chisel Hook



Fig. D. 108.

4	foot maple handle.....	per doz.,	\$25 00
4½	" " " ".....	"	25 55
5	" " " ".....	"	26 16

Discount.....

SHACKLE BAR.



Fig. D. 109.

Price.....	\$5 00
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Discount.....

PAY OUT REEL.

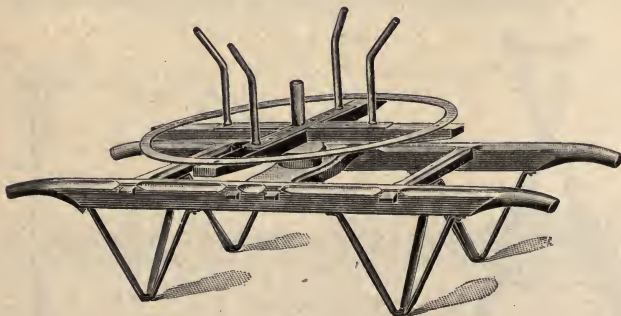


Fig. D. 110.

Each.....	\$20 00
Carrying frame is strongly mortised. Reel is heavy, ironed and bolted	
It is made from the best clear oak to stand the hardest work.	
Reels, without carrying frame.....	each, \$12 00

Discount.....

FOLDING TAKE UP REEL.

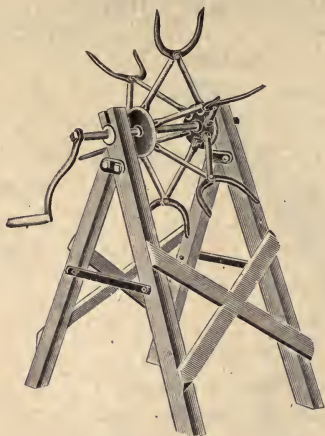
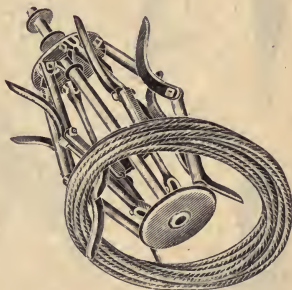


Fig. D. 111.

Fig. D. 112.
Folded.

The stand is wood and folds together for shipment. The Reel is of malleable iron and as shown in the illustration, when the key is taken out of the shaft, it becomes longer but smaller in diameter allowing the coil of wire to fall off.

No. 863.	To make 12 in. coil, each.....	\$13 90
No. 864.	To make 18 in. coil, each.....	14 30
No. 865.	To make 24 in. coil, each.....	15 00

Discount.....

NEW "CHICAGO GRIP."

It Grips and Holds and is Most Convenient to Handle.

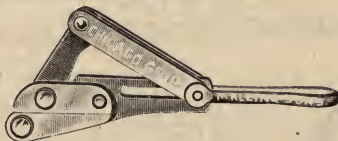


Fig. D. 113.

For No. 10 wire and smaller, each.....	\$ 3 80
For No. 6 wire and smaller, each.....	4 00
For No. 0 wire and smaller, each.....	6 60
For No. 0000 wire and smaller, each.....	10 00

Discount.....



Fig. D. 114.
Duckbill.



Fig. D. 115.
Duckbill.

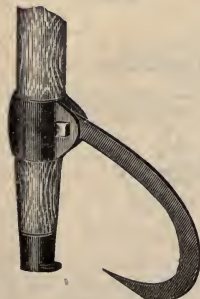


Fig. D. 116.
Chisel Hook

PEAVIES AND CANT HOOKS.

PEAVIES.

Malleable solid socket.

Duckbill or round hook.

No. 19.	2½-in.	x	4-foot	rock maple handle.	doz.,	\$25 70
No. 20.	2½	"	x	4½	" " " "	26 40
No. 21.	2½	"	x	5	" " " "	27 10
No. 22.	2½	"	x	5½	" " " "	27 80

Discount.....

CANT HOOKS.

Malleable clasp.

Duck bill, round or chisel hook.

With extension toe ring.

No. 222.	2½-in.	x	4½-foot	rock maple hndl.	doz.,	\$19 40
No. 223.	2½	"	x	5	" " " "	20 00
No. 224.	2½	"	x	5½	" " " "	20 65

Discount.....

With short toe ring.

No. 318.	2½-in.	x	4½-foot	rock maple hndl.	doz.,	\$18 50
No. 319.	2½	"	x	5	" " " "	19 10
No. 320.	2½	"	x	5½	" " " "	19 70

Discount.....

EXTRA HEAVY TOOLS.

No. 24.	2½-in.	x	5-foot	Peavies.....	doz.,	\$31 10
No. 28.	3.	"	x	5	" " " "	34 90
No. 226.	2½	"	x	5	" Cant Hooks....	23 15
No. 230.	3	"	x	5	" " " "	28 85

Discount.....

Always order by number, giving style of hook wanted, otherwise furnished as shown in cut.

PATENT TIE GRAPPLING PEAVEY.

A very useful tool for loading and unloading railroad ties, small timbers, posts, etc., and for handling frozen ties. With this tool twice as many ties can be handled with less labor than with bare hands.



Fig D. 117.

Price, 3-foot maple handle..... Per doz., \$32 50

Discount.....

PICKAROONS.

For Handling Railroad Ties, Pulp Wood, Etc.

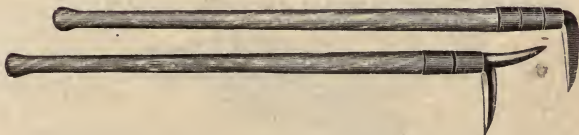


Fig. D. 118.

Price, 2-foot handle, hook only.....	Per doz., \$15 25
" 3-foot handle, hook only.....	Per doz., 15 75
" 2-foot handle, hook and pike.....	Per doz., 16 25
" 3-foot handle, hook and pike.....	Per doz., 16 75

Discount.....

SCYTHES.



Fig. D. 119.

Railroad Grass Scythes.....per doz., \$9 00

Discount.....



Fig. D. 120.

Bush or Weed, Cast Steel.....per doz., \$9 00

Discount.....

SCYTHER SNATHS.



Fig. D. 121.

Patent Loop, Extra White Ash, Iron Trimmed.....per doz., \$9 50

Discount.....

Bush Snaths.

Patent Loop, Extra Heavy, Iron Trimmed.....per doz., \$11 00

Socket Heel, with Two Rings “ “ “ 10 00

Discount.....

BUSH HOOKS.

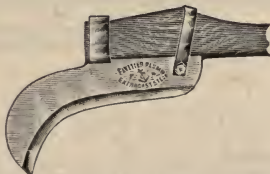


Fig. D. 122.

Cast Steel, 2 lb. 4 oz.....per doz., \$15 00

Discount.....

POST MAULS.
With Iron Rings.



Fig. D. 123.

	Each		Each
4x 7.....	\$3 00	7x10.....	\$4 20
5x 7.....	3 40	7x11.....	4 40
6x 8.....	3 80	8x10.....	4 40
5x10.....	3 80	8x11.....	4 60
6x10.....	4 00	8x12.....	5 00

Discount.....



HOES.
Scuffle.

Fig. D. 124.

8-in. polished steel blade, 4 inches deep, 5-foot handles.....doz., \$12 00

Discount.....

Mortar.



Fig. D. 125.
Plain.

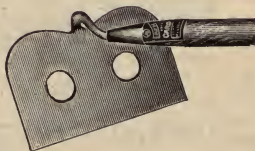


Fig. D. 126.
Punched.

	9-in. polished blade, plain,	5½-foot handle.....	per doz., \$23 50
10	" " "	" " 6 " "	" 25 40
9	" " "	punched, 5½-foot handle.....	" 26 00
10	" " "	" " 6 " "	" 27 90

Discount.....

TRACK GAUGES.

Huntington.
Standard.

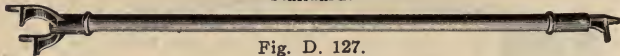


Fig. D. 127.

Guard Rail.

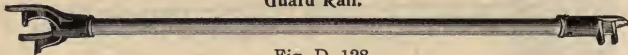


Fig. D. 128.

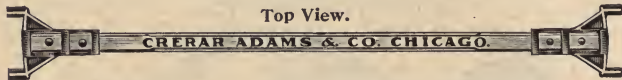
†Standard.....	each	\$1 50
†Guard Rail.....	“	2 00
†Adjustable.....	“	3 50
†Insulated.....	extra,	25

Discount.....

FORD.

Wood Bar. Radial Ends.
Insulated.

Top View.



Side View.

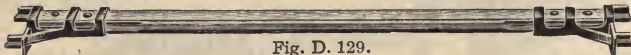


Fig. D. 129.

Price.....	each,	\$1 50
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Discount.....

TRACK LEVEL.

Crerar, Adams & Co.'s.



Fig. D. 130.

Price.....	each,	\$3 50
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Discount.....

COMBINED TRACK GAUGE AND LEVEL.

McManus.

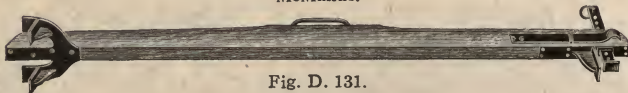


Fig. D. 131.

Price.....	each,	\$3 00
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Discount.....

TRACK WRENCHES.



Fig. D. 132.

Priceper lb 14c

Discount.....

RAIL FORKS.



Fig. D. 133.

Price.....per lb. 20c

Discount.....

RAIL TONGS.



Fig. D. 134.

Price.....per lb., 20c

Discount.....

SPIKE PULLER.

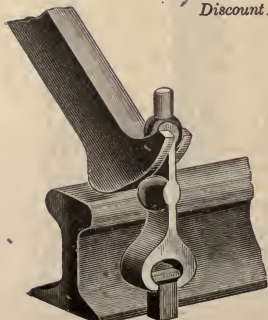


Fig. D. 135.

Will draw spikes from between contiguous rails, guard rails, switches, frogs and at platforms; can also be used on bridges and in tunnels and cuts; can be attached to any claw bar, and will bend the spike less than when pulled in the usual way.

Is made of tempered steel, and is light, strong, durable and cheap.

Solid Steel, weight $1\frac{1}{2}$ lbs.....each, 75c

Discount.....

BARS. Crow Bar.



Fig. D. 136.

Lining Bar



Fig. D. 137

Pinch Bar



Fig. D. 138.

Pinch Bar, With Heel.



Fig. D. 139.

Pinch, Lining and Crow Bars, all Steel	per lb., 10c
Pinch Bars, with Heel, all Steel	" 12c

Discount

CLAW BARS



Fig. D. 140.

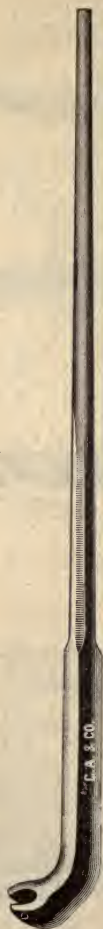


Fig. D. 141

With heel.....	per lb., \$0 12
Goose neck.....	" 12

Discount.....

TAMPING BAR.



Fig. D. 142.

Tamping Bars.....	per lb., \$0 12
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TIMBER BAR.



Fig. D. 143.

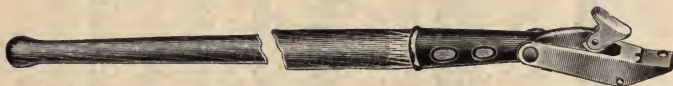
Diamond and Chisel Point, Standard length 5 feet.....	per lb. \$0 14
<i>Discount.....</i>	

CAR MOVERS.**Easy.****Fig. D. 144.**

Price..... \$5 00

Sheldon.**Fig. D. 145.**

Price..... \$5 00

Badger**Fig. D. 146.**

Price..... \$5 00

Samson.**Fig. D. 147.**

Price \$5 00

Atlas.**Fig. D. 148.**

Price..... \$5 00

WHEEL WRENCH.

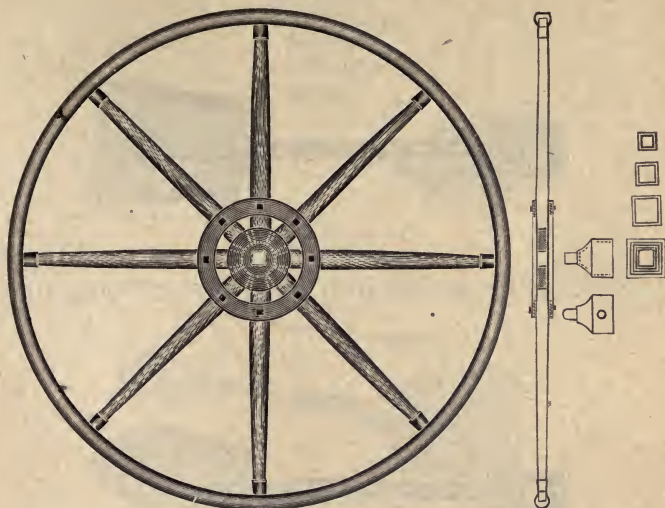


Fig. D. 149.

Price, with Full Set Sockets\$50 00

TIMBER TRUCKS OR DOLLYS.

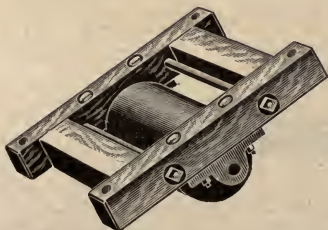


Fig. D. 150.

Plain Roller, each.....\$5 00

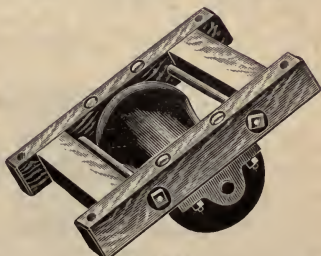


Fig. D. 151.

Concave Roller, each.....\$6 00

Discount.....

SHOVELS.

Calumet.

Tamping.



Fig. D. 155

With Bolton & Johnson's patent handle $9\frac{1}{2} \times 11\frac{1}{4}$ in.....per doz., \$14 25

Moulders.

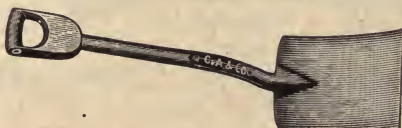


Fig. D. 156.

No. 2, Polished, $10 \times 11\frac{1}{4}$ in.....per doz., \$11 00
 No. 2, "Hadwin," $10 \times 11\frac{1}{4}$ in....." 8 00

Discount

Charcoal or Snow.

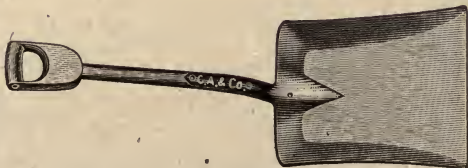


Fig. D. 157.

No. 15, Charcoal or Snow Shovels, $15\frac{1}{2} \times 18$ in.....per doz. \$27 00

Discount

SHOVELS.

Ames' Genuine.



Fig. D. 158.

(D Handle)

No. 2.	Black, Square Point,	$9\frac{1}{2} \times 11\frac{1}{2}$ in.....	per doz.,	\$15 00
No. 2.	Polished, " "	$9\frac{1}{2} \times 11\frac{1}{2}$ "	"	16 00
No. 3.	Black, " "	$10 \times 12\frac{1}{2}$ "	"	16 00
No. 3.	Polished, " "	$10 \times 12\frac{1}{2}$ "	"	17 00
No. 4.	Black, " "	$10\frac{1}{2} \times 13$ "	"	16 75
No. 6.	" " "	$11\frac{1}{2} \times 13\frac{1}{2}$ "	"	18 75
No. 2.	Black, Round Point,	$9\frac{1}{2} \times 12\frac{3}{4}$ in.....	(See Fig. D. 153)	" 16 00
No. 2.	Polished " "	$9\frac{1}{2} \times 12\frac{3}{4}$ "	" " "	" 17 00
No. 3.	Black, " "	$9\frac{1}{2} \times 13$ "	" " "	" 16 75
No. 3.	Polished, " "	$9\frac{1}{2} \times 13$ "	" " "	" 17 75
No. 2.	Black, Square Point, Tamping,	$9\frac{1}{2} \times 11\frac{1}{2}$ in..	(See Fig. D. 155)	" 15 00
No. 2.	Moulders.....	(See Fig. D. 156)	"	16 00
No. 2.	Brick.....		"	15 00

(Long Handle)

No. 2.	Black, Square Point,	$9\frac{1}{2} \times 11\frac{1}{2}$ in.....	per doz.,	\$15 00
No. 2.	Polished, " "	$9\frac{1}{2} \times 11\frac{1}{2}$ "	"	16 00
No. 2.	Black, Round " "	$9\frac{1}{2} \times 12\frac{1}{2}$ "	(See Fig D. 154)	" 15 00
No. 2.	Polished, " "	$9\frac{1}{2} \times 12\frac{1}{2}$ "	" " "	" 16 00

Discount.....

Erie Brand.

No. 2	Black D. H., Square Point,	$9\frac{1}{2} \times 11\frac{1}{2}$ in.....	per doz.,	\$10 00
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Discount.....

COAL AND ORE SHOVELS.



Fig. D. 159.

No. 3, 9 $\frac{1}{2}$ x12 $\frac{1}{2}$	per doz.	\$13 75
No. 4, 10 $\frac{1}{2}$ x12 $\frac{1}{2}$	"	14 25
No. 5, 10 $\frac{1}{2}$ x13.....	"	14 75
No. 6, 11 $\frac{1}{2}$ x13 $\frac{1}{2}$	"	15 75

Discount.....

SPADES.

Ames.



Fig. D. 160.

No. 2, Long or D. Handle, Steel (polished).....	per doz.,	\$16 25
Black.....	"	15 25

Discount.....

Calumet Brand.

No. 2, Long or D. Handle, Steel.....	per doz.,	\$13 00
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Discount.....

POLISHED DRAIN SPADES.

Ames.



Fig. D. 161.

Length.....	16 in.	18 in.	20 in.	22 in.	24 in.
No. 2.....per doz.,	\$16 00	16 50	17 00	17 50	18 25

Discount.....

SPOONS.

Fig. D. 162.

Ames' No. 2 Cast Steel Spoons for Digging Post Holes.

7 foot Handles.....	per doz.,	\$19 25
8 " ".....	"	21 00
9 " ".....	"	22 75
10 " ".....	"	24 50

Discount.....



Fig. D. 162.

STEEL SCOOPS.



Fig. D. 163.

Ames' Steel, Polished.

22-inch Handle, for Locomotives.

Nos.....	2	3	4	5	6	7	8	9	10
Width, inches.....	11	11½	12	12½	12¾	13¼	14	14½	15
Length, ".....	15	15½	16	16½	17	17½	17¾	18	18½
Per dozen.....	\$18 50	19 00	19 50	20 00	20 50	21 25	22 00	23 00	23 50

We carry Nos. 3 to 8 in 26-inch handle at same list; black, 50 cents net less per dozen

We also carry Re-enforced Scoops with strap riveted on back of blade at 75 cents net per dozen extra; Extra Re-enforced, \$1.75 net per dozen extra.

Discount.....



Fig. D. 164.

Wm. Chisholm & Son's Thick Center.

22-inch Handle for Locomotives.

Nos.....	82	83	84	85	86	87	88
Size.....	2	3	4	5	6	7	8
Width, inches.....	11	11½	11¾	12	12½	13¼	13½
Length, ".....	15	15½	15¾	16½	17	16¾	17
Per dozen.....	\$16 75	17 75	18 75	19 50	20 25	21 25	22 25

26-inch Handle, same list.

Discount.....

STEEL SCOOPS.

Locomotive Brand.



Fig. D. 165.

Hollow Back.

22-inch Handle, for Locomotives

Nos.....	2	3	4	5	6	7	8
Width, inches.....	11	11½	11¾	12	12	13¼	13½
Length, inches.....	15	15½	16	16½	17	16¾	17
Per dozen.....	\$10 75	11 50	11 75	12 25	12 75	13 25	13 75

We also carry above in 26-inch handles at same list.

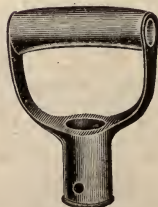
Discount.

Fig. D. 166.

D TOPS.

Malleable Iron.

Made from high grade malleable iron for railroad tamping shovels.

Price.....per doz., \$3 00

Discount.....

FORKS.



Fig. D. 167.

30-inch, Wood, D handle.

Stone or Ballast.

Square Tine.

Tines.....	8	10	12	12	14
Length of tines, inches.....	13½	13½	13½	14½	13½
Width at center, inches.....	10½	13	11½	13	12
Space between tines, inches...	1½	1½	1½	1½	1½
Per dozen.....	\$20 00	25 00	29 00	29 00	33 00

Discount.....

Coal.

Diamond Tine.

Tines.....	10	10	12	12	12	14	14
Length of tines, inches.....	14	15	16	15	14	15	15
Width at center, inches.....	11½	13	16	13	11½	14	12½
Space between tines, inches...	1½	1½	1	1½	1½	1½	1½
Per dozen.....	\$25 00	25 00	29 00	29 00	29 00	33 00	33 00

Discount.....

Coke.

Diamond Tine.

Tines.....	8	9	10	12	12	14
Length of tines, inches.....	15½	16	17	17	17	17
Width at center, inches.....	11½	13	14	18	16	20½
Space between tines, inches...	1½	1½	1½	1½	1	1½
Per dozen.....	\$20 00	22 00	24 00	28 00	28 00	33 00

Tines.....	14	16	16	18	18
Length of tines, inches.....	17	17	17	17	17
Width at center, inches.....	18	19½	18	20½	16
Space between tines, inches...	1	1	1	1	1
Per dozen.....	\$33 00	40 00	40 00	48 00	48 00

Discount.....

RAILS.



Fig. D. 168.

Weight per Yard	Tons per Mile.
8 lbs.	12 $\frac{1280}{2240}$
12 "	18 $\frac{1280}{2240}$
16 "	25 $\frac{320}{2240}$
25 "	39 $\frac{640}{2240}$
30 "	47 $\frac{320}{2240}$
35 "	55
40 "	62 $\frac{1280}{2240}$
45 "	70 $\frac{1280}{2240}$
50 "	78 $\frac{1280}{2240}$
52 "	81 $\frac{1600}{2240}$
56 "	88
57 "	89 $\frac{1280}{2240}$
60 "	94 $\frac{640}{2240}$
62 "	97 $\frac{960}{2240}$
64 "	100 $\frac{1280}{2240}$
65 "	102 $\frac{320}{2240}$
68 "	106 $\frac{1280}{2240}$
70 "	110
72 "	113 $\frac{320}{2240}$
76 "	119 $\frac{960}{2240}$
80 "	125 $\frac{2240}{2240}$
85 "	133 $\frac{1280}{2240}$
90 "	141 $\frac{960}{2240}$

To find the number of tons (of 2,240 lbs.) per mile of single track, multiply the pounds per yard by 11 and divide by 7.

Example—For 56 pound rail: $56 \times 11 = 616 \div 7 = 88$ tons.

The number of tons of 2,000 lbs. required per mile is very nearly $1\frac{1}{4}$ times the weight per yard.

We are at all times prepared to contract for delivery of new or relaying rails, and invite correspondence or personal application.

Splice Bars.

Plain. per lb., | Angle. per lb.,

Complete Joints for Light Rails.

8 and 10 lbs. each, | 12 and 16 lbs. each, | 20 lbs. each.

Prices upon application.

THE IMPROVED ROLLER RAIL BENDER AND STRAIGHTENER.

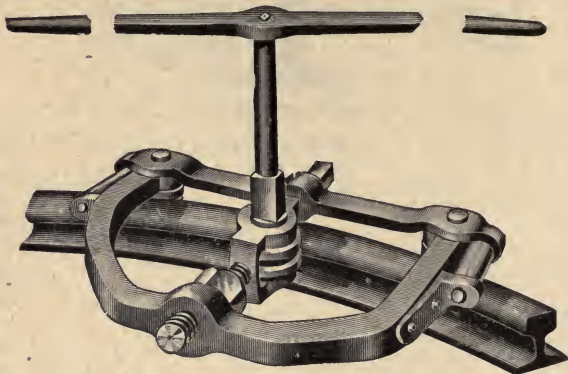


Fig. D. 169.

Place bender over rail, as shown above, turn up nut on center screw with long wrench furnished with each machine, until set for desired curve, then place socket wrench on pin in center roller, put long lever on top of socket, and then one or more men at each end of lever can turn center roller, which causes the machine to move forward on rail, bending same as it moves. To straighten rails place machine on *opposite* side of curve and then operate as above.

The number of men necessary to do the work is governed by weight of rail and curvature desired.

When ordering always send tracing of rail section.

No. 1—	For rail 20 to 40 lbs.	weight 300.....	\$105 00
2—	" 41 to 60 "	" 360.....	115 00
3—	" 61 to 70 "	" 400.....	140 00
4—	" 71 to 80 "	" 470.....	180 00
5—	" 81 to 90 "	" 520.....	230 00
6—	" 91 to 100 "	" 830.....	400 00

Discount.....

THE EMERSON PATENT RAIL BENDING AND STRAIGHTENING MACHINES.

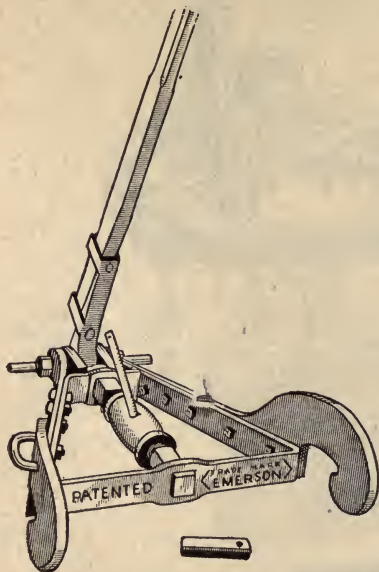


Fig. D. 170.

THE EMERSON PATENT UNIVERSAL BENDER.

For Yards and Terminals.
For Surface and Line Bending.
Also for Restoring Crooked
Rails to Original Shape.

Price.....\$200 00
With frame and rollers.

\$7 50 extra for dies if intended
for line curving.

No. 1, For Tee Rails up to 45 lbs.....	\$100 00
No. 2, For Tee Rails 45 to 65 lbs.....	118 00
No. 3, For Tee Rails 65 to 90 lbs.....	143 00
No. 4, For Tee Rails 90 to 115 lbs.....	175 00

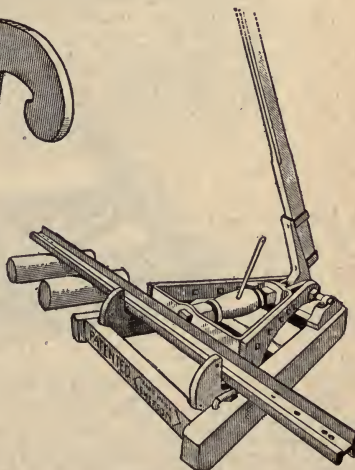


Fig. D. 171.

Discount.....

RAIL BENDERS.

"Jim Crow."

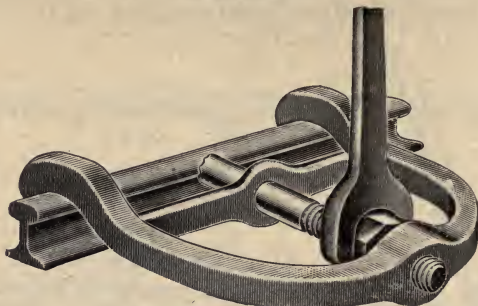


Fig. D. 172.

No.	Capacity	Weight Crow	Weight Wrench	Price Complete
1	For rails 70 lbs. and over	240 lbs.	42 lbs.	\$40 00
2	" rails 50 to 70 lbs.	195 "	42 "	30 00
3	" light rails 20 to 50 lbs....	140 "	31 "	27 00
4	" rails 20 lbs. and lighter...	65 "	18 "	22 00

Discount.....

Samson.

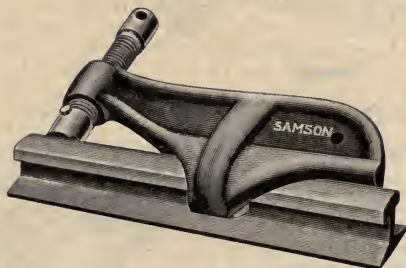


Fig. D. 173.

Will bend 100-pound rails in position, without drawing spikes, when taking kinks out of track.

One man can operate.

Frame is made of open hearth steel—very strong.

Screw is of steel, working in bronze nut, and provided with anti-friction washer.

Thrust piece hardened steel.

Weight 100 lbs. Price.....\$75 00

Discount.....

NEW GIANT RAIL BENDER AND STRAIGHTENER.

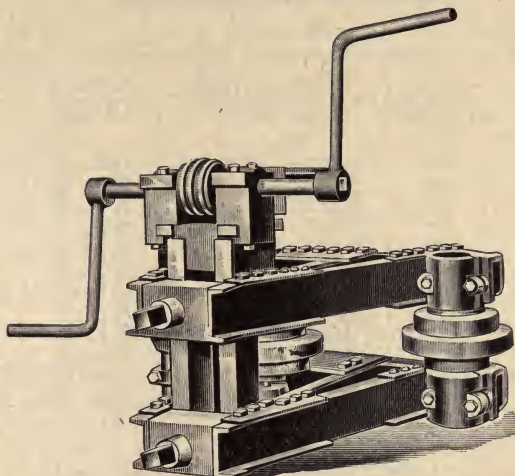


Fig. D. 174.

This machine is especially constructed to bend the heavy rail now being so generally adopted. Its weight is such that it may be worked in a stationary position, the rail passing along slowly through the rolls; the curving is constant, and the work is truer than a bend made under a thrust or blow attended by a continued shifting of the rail by hand.

For best results the rolls should be turned to the templet of the rails to be curved. If the machine is to be used on rails of different heights the rolls will be fitted to the lighter rail.

Rolls turned to a four inch rail will usually work up to a four and one-half inch rail; fitted to a four and one-half inch rail will work up to a five-inch rail.

Surface bends may be taken out in this machine, but rolls made specially for that size rail are required, and are extra.

Weight 500 pounds.....	each,	\$350 00
Equipped for belt or electric power.....	"	400 00

Discount.....

RAILROAD SPIKES.



Adopted Feb. 1, 1911.

Fig. D. 175.

Size measured under head.	Average No. per keg of 200 lbs.	Ties 2 feet between centre, 4 spikes per tie, makes per mile.	Rail used weight per yard.	Extras per lb.
5½ x ⅞	360	5920 lbs.—29½ Kegs.	45 to 100	Base
5 x ⅞	405	5230 " —26 "	40 to 56	"
4½ x ⅞	460	4606 " —23 "	35 to 40	"
5 x ¾	475	4460 " —22 ⅜ "	35 to 40	10
4½ x ¾	518	4080 " —20 ⅞ "	28 to 35	10
4 x ¾	605	3515 " —17 ½ "	24 to 35	10
3½ x ¾	670	3180 " —15 ⅞ "	20 to 30	10
4½ x ⅞	690	3090 " —15 ½ "	20 to 30	20
4 x ⅞	780	2730 " —13 ⅜ "	20 to 30	20
3½ x ⅞	890	2377 " —12 "	16 to 25	20
4½ x ¾	780	2730 " —13 ⅜ "	16 to 25	30
4 x ¾	1025	2044 " —10 ⅝ "	16 to 25	30
3½ x ¾	1250	1740 " —8 ½ "	16 to 20	30
3 x ¾	1380	1592 " —8 "	16 to 20	30
2½ x ¾	1650	1280 " —6 ⅝ "	12 to 16	40
3 x ⅞	1880	1152 " —5 ¼ "	12 to 16	60
2½ x ⅞	2230	948 " —4 ¾ "	8 to 12	60

Reverse Points, ¼ cent extra (smallest 3 x ⅞).

Frost or Shimming Spikes.

8 x ⅞ in stock.....per lb., \$......
 Other sizes from mill.

Screw Railroad Track Spikes.



Fig. D. 176.

We are now prepared to furnish, in any quantities, the Screw Railroad Track Spikes, as illustrated.

This is the Spike as shown in the Bureau of Forestry Bulletin No. 50, Figure No. 38.

Full and detailed information, as well as samples, furnished on application.

BOAT SPIKES.



Fig. D. 177.

Average Number Per Keg of 200 Pounds.

Length.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
4-inch	2,375			
5 "	2,050	1,230	940	
6 "	1,825	1,175	800	450
7 "		990	650	375
8 "		880	600	335
9 "			525	300
10 "			475	275

Extras Over Base Price Railroad Spikes

$\frac{3}{4}$ -inch square, 12 to 24 in length.....	\$0 15
$\frac{1}{2}$ " 8 " 16 "	15
$\frac{1}{2}$ " 6 " 16 "	15
$\frac{1}{2}$ " 6 " 12 "	20
$\frac{1}{2}$ " 4 " 12 "	30
$\frac{1}{2}$ " 4 " 8 "	45
$\frac{1}{2}$ " 4 " 8 "	75
$\frac{1}{2}$ " 3 " 3 $\frac{1}{2}$ "	1 00
$\frac{3}{8}$ and $\frac{5}{16}$ shorter than 4 inches $\frac{1}{4}$ cent extra	

CROSS TIES PER MILE OF SINGLE TRACK.

18 inches from center to center.....	3520 ties.
20 " " "	3168 "
22 " " "	2889 "
22.5 " " "	2816 "
24 " " "	2640 "
25.7 " " "	2464 "
27 " " "	2317 "
27.7 " " "	2288 "
30 " " "	2112 "
33 " " "	1920 "
36 " " "	1760 "

FISH PLATES AND BOLTS FOR ONE MILE SINGLE TRACK.

Four Bolts Per Joint.

Length of Rail.	No. Fish Plates Required.	No. Bolts.	No. of Rails or Complete Joints.
24 feet	880	1760	440
25 "	844	1688	422
26 "	812	1624	406
27 "	782	1564	391
28 "	754	1508	377
30 "	704	1408	352
30 " 10 per cent s't.....	710	1420	355
30 " 8 " " "	708	1416	354
30 " 6 " " "	706	1412	353

TRACK BOLTS.

Rolled or Cut Thread.



Fig. D. 178.

Oval Neck; Button Head; Square or Hexagon Nuts.

List of Extras on Track Bolts.

	Square Nuts Advance Over Base Per 100 lbs.	Hexagon Nuts Advance Over Base Per 100 lbs.
$\frac{1}{2}$ x $3\frac{1}{2}$ inches and larger.....	Base	\$0 15
$\frac{1}{2}$ x $3\frac{1}{4}$ inch.....	\$0 05	20
$\frac{1}{2}$ x 3 ".....	15	30
$\frac{1}{2}$ x 3 ".....	40	70
$\frac{1}{2}$ x $2\frac{1}{2}$ ".....	50	80
$\frac{1}{2}$ x $2\frac{1}{4}$ ".....	65	95
and $\frac{9}{16}$ x $2\frac{1}{2}$ inch.....	90	1 25
and $\frac{9}{16}$ x $2\frac{1}{4}$ ".....	1 05	1 40
and $\frac{9}{16}$ x 2 ".....	1 25	1 60

Average No. in a Keg of 200 lbs.

Size Bolt.	Size Nut.	Square Nuts.	Hex. Nuts.	Size Bolt.	Size Nut.	Square Nuts.	Hex. Nuts.
$\frac{1}{2}$ x $4\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{2}$	149	156	$\frac{1}{2}$ x $3\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{2}$	258	266
$\frac{1}{2}$ x $4\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{1}{2}$	151	158	$\frac{1}{2}$ x $3\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{1}{2}$	243	261
$\frac{1}{2}$ x $4\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{4}$	153	160	$\frac{1}{2}$ x $3\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{4}$	266	275
$\frac{1}{2}$ x $4\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{2}$	155	163	$\frac{1}{2}$ x 3	$1\frac{1}{8}$ x $\frac{1}{2}$	250	270
$\frac{1}{2}$ x $4\frac{1}{4}$	$1\frac{1}{2}$ x $\frac{1}{4}$	157	165	$\frac{1}{2}$ x 3	$1\frac{1}{8}$ x $\frac{1}{4}$	276	286
$\frac{1}{2}$ x $4\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{2}$	159	168	$\frac{1}{2}$ x $3\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{1}{4}$	366	395
$\frac{1}{2}$ x 4.....	$1\frac{1}{2}$ x $\frac{1}{2}$	161	170	$\frac{1}{2}$ x 3	$1\frac{1}{8}$ x $\frac{5}{8}$	436	459
$\frac{1}{2}$ x 4.....	$1\frac{1}{8}$ x $\frac{1}{2}$	163	173	$\frac{1}{2}$ x $2\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{2}$	379	410
$\frac{1}{2}$ x $4\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{1}{4}$	215	228	$\frac{1}{2}$ x $2\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{5}{8}$	448	479
$\frac{1}{2}$ x $4\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{2}$	234	240	$\frac{1}{2}$ x $2\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{2}$	390	425
$\frac{1}{2}$ x 4.....	$1\frac{1}{8}$ x $\frac{1}{2}$	222	236	$\frac{1}{2}$ x $2\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{5}{8}$	460	498
$\frac{1}{2}$ x 4.....	$1\frac{1}{2}$ x $\frac{1}{4}$	241	248	$\frac{1}{2}$ x $2\frac{1}{2}$	$1\frac{1}{8}$ x $\frac{1}{2}$	515	555
$\frac{1}{2}$ x $3\frac{1}{4}$	$1\frac{1}{2}$ x $\frac{1}{2}$	229	244	$\frac{1}{2}$ x $2\frac{1}{4}$	$1\frac{1}{8}$ x $\frac{1}{4}$	547	593
$\frac{1}{2}$ x $3\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{2}$	249	257	$\frac{1}{2}$ x $2\frac{1}{2}$	1 x $\frac{1}{2}$	733	760
$\frac{1}{2}$ x $3\frac{1}{2}$	$1\frac{1}{2}$ x $\frac{1}{4}$	236	253	$\frac{1}{2}$ x 2	1 x $\frac{1}{2}$	793	820

RAIL SAWING MACHINE.

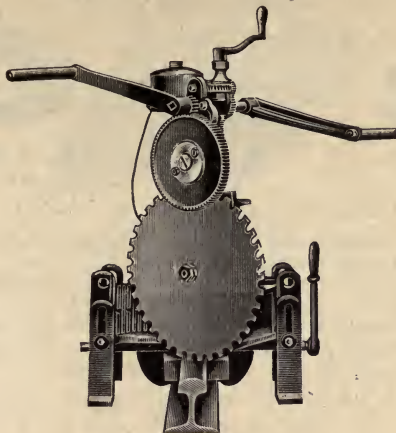


Fig. D. 179.

The Nos. 5 and 6 Portable Rail Saws are designed for cutting rails off at right angles to their length only. The No. 5 saw has sufficient capacity for sawing all steam rails up to and including 100 lbs. per yard. The No. 6 saw will practically cut a nine-inch girder rail of any regular section. The saw is secured to the rail by adjustable clamp jaws in the base, which are tightened by a screw and lever.

The Nos. 5-A and 6-A Portable Rail Saws are designed for cutting rails off at an angle with their length, and can be set to cut at any angle up to 45 degrees, varying by 5 degrees. The saw blade commences cutting in the center of the head of the rail, and will make a true vertical cut at whatever angle is desired, leaving the ends of the rail perfectly smooth and straight.

The No. 5-A saw has sufficient capacity for cutting all steam rails up to 100 lbs. per yard; the No. 6-A will cut all rails up to a nine-inch girder, and is especially valuable for street railway use.

The reducing gearing is arranged on the slide supporting the saw blade, and a simple form of automatic feed lowers the saw at the proper speed for cutting the head or base of the rail. The feed screw is driven by a friction nut, which can be quickly released to feed the saw by hand through the web of the rail or return the slide.

A pawl prevents the saw blade from being turned backwards, which must never be done when in a cut.

Furnished complete with Saw Grinder, Two Saw Blades, and all necessary Wrenches.

Diam. Blade.		Depth of Cut.	Weight.	Price.
No. 5.....	16 in.	6½ in.	256 lbs.	\$125 00
No. 5A.....	16 "	6½ "	285 "	150 00
No. 6.....	20½ "	9 "	310 "	150 00
No. 6A.....	20½ "	9 "	388 "	175 00
No. 7.....	18 "	7½ "	300 "	150 00

Discount

° NUT LOCKS.



Fig. D. 180.
Ribbed.

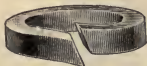


Fig. D. 181.
Plain.



Fig. D. 182.
Tail.

Packed in boxes of 1,000 or 1,500, as desired.

For use on fish plates, cars, locomotives, switches, and every place where it is necessary to have a perfectly tight nut.

It is made of the best steel, oil tempered, and each one carefully tested and inspected.

It costs no perceptible time to apply and cannot be put on wrong. It is very elastic. After years of use it will be found to retain its elasticity, and, when taken off for repairs of track, can be applied again.

Nut Locks. per M. \$.

In stock for Bolts $\frac{1}{2}$ -inch to $1\frac{1}{4}$.

JONES' SPUR NUT LOCKS.

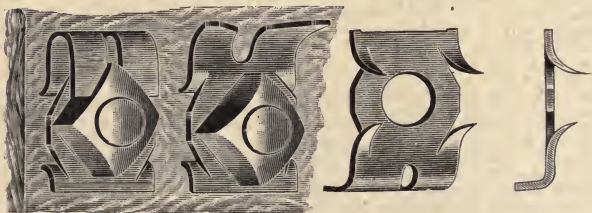


Fig. D. 183.

With Spur for Use on Wood

Diameter of Bolt	Price per 1,000	Approximate Shipping Weight per 1,000	Diameter of Bolt	Price per 1,000	Approximate Shipping Weight per 1,000
$\frac{3}{8}$ in.	\$14 30	32 lbs.	$\frac{7}{8}$ in.	\$20 90	130 lbs.
$\frac{1}{2}$ "	15 50	45 "	1 "	23 30	176 "
$\frac{5}{8}$ "	17 00	67 "	$1\frac{1}{8}$ "	26 00	234 "
$\frac{3}{4}$ "	18 80	92 "	$1\frac{1}{4}$ "	29 00	296 "

Discount.

JONES' NUT LOCKS.

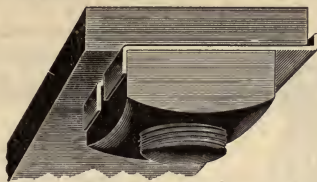


Fig. D. 184.
For Arch and Tie Bars.

Diameter of Bolt.	Width of Bar Inches.	Distance From Center to Edge.	Price per 1000.	Diameter of Bolt.	Width of Bar Inches.	Distance From Center to Edge.	Price per 1000.
$\frac{1}{2}$ inch.....	$1\frac{1}{2}$	$\frac{3}{4}$	\$12 00	$\frac{7}{8}$ inch.....	4	2	\$21 60
$\frac{1}{2}$ ".....	$1\frac{3}{4}$	$\frac{7}{8}$	12 60	$\frac{7}{8}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	22 50
$\frac{1}{2}$ ".....	2	1	13 20	$\frac{7}{8}$ ".....	5	$2\frac{1}{2}$	23 40
$\frac{1}{2}$ ".....	$2\frac{1}{4}$	$1\frac{1}{8}$	14 00	$\frac{7}{8}$ ".....	$5\frac{1}{2}$	$2\frac{3}{4}$	24 30
$\frac{1}{2}$ ".....	$2\frac{1}{2}$	$1\frac{1}{4}$	14 70	$\frac{7}{8}$ ".....	6	3	25 20
$\frac{1}{2}$ ".....	$2\frac{3}{4}$	$1\frac{3}{8}$	15 50	1 ".....	2	1	19 50
$\frac{1}{2}$ ".....	3	$1\frac{1}{2}$	16 20	1 ".....	$2\frac{1}{2}$	$1\frac{1}{4}$	20 40
$\frac{1}{2}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	17 10	1 ".....	3	$1\frac{1}{2}$	21 30
$\frac{1}{2}$ ".....	4	2	18 00	1 ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	22 20
$\frac{1}{2}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	19 20	1 ".....	4	2	23 10
$\frac{5}{8}$ ".....	$1\frac{1}{2}$	$\frac{3}{4}$	13 80	1 ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	24 00
$\frac{5}{8}$ ".....	$1\frac{3}{4}$	$\frac{7}{8}$	14 40	1 ".....	5	$2\frac{1}{2}$	24 90
$\frac{5}{8}$ ".....	2	1	15 00	1 ".....	$5\frac{1}{2}$	$2\frac{3}{4}$	25 80
$\frac{5}{8}$ ".....	$2\frac{1}{4}$	$1\frac{1}{8}$	15 60	1 ".....	6	3	26 70
$\frac{5}{8}$ ".....	$2\frac{1}{2}$	$1\frac{1}{4}$	16 20	$1\frac{1}{8}$ ".....	3	$1\frac{1}{2}$	22 20
$\frac{5}{8}$ ".....	$2\frac{3}{4}$	$1\frac{3}{8}$	16 70	$1\frac{1}{8}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	23 00
$\frac{5}{8}$ ".....	3	$1\frac{1}{2}$	17 10	$1\frac{1}{8}$ ".....	4	2	23 70
$\frac{5}{8}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	18 00	$1\frac{1}{8}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	24 50
$\frac{5}{8}$ ".....	4	2	18 90	$1\frac{1}{8}$ ".....	5	$2\frac{1}{2}$	25 20
$\frac{5}{8}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	19 80	$1\frac{1}{8}$ ".....	$5\frac{1}{2}$	$2\frac{3}{4}$	26 10
$\frac{5}{8}$ ".....	$1\frac{1}{2}$	$\frac{3}{4}$	16 50	$1\frac{1}{8}$ ".....	6	3	27 00
$\frac{3}{4}$ ".....	$1\frac{3}{4}$	$\frac{7}{8}$	16 80	$1\frac{1}{4}$ ".....	3	$1\frac{1}{2}$	23 10
$\frac{3}{4}$ ".....	2	1	17 30	$1\frac{1}{4}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	23 70
$\frac{3}{4}$ ".....	$2\frac{1}{4}$	$1\frac{1}{8}$	17 60	$1\frac{1}{4}$ ".....	4	2	24 30
$\frac{3}{4}$ ".....	$2\frac{1}{2}$	$1\frac{1}{4}$	18 00	$1\frac{1}{4}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	24 90
$\frac{3}{4}$ ".....	$2\frac{3}{4}$	$1\frac{3}{8}$	18 30	$1\frac{1}{4}$ ".....	5	$2\frac{1}{2}$	25 80
$\frac{3}{4}$ ".....	3	$1\frac{1}{2}$	18 80	$1\frac{1}{4}$ ".....	$5\frac{1}{2}$	$2\frac{3}{4}$	27 00
$\frac{3}{4}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	19 50	$1\frac{1}{4}$ ".....	6	3	28 50
$\frac{3}{4}$ ".....	4	2	20 10	$1\frac{3}{8}$ ".....	3	$1\frac{1}{2}$	23 70
$\frac{3}{4}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	20 70	$1\frac{3}{8}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	24 30
$\frac{3}{4}$ ".....	5	$2\frac{1}{2}$	21 30	$1\frac{3}{8}$ ".....	4	2	24 90
$\frac{7}{8}$ ".....	2	1	18 30	$1\frac{3}{8}$ ".....	$4\frac{1}{2}$	$2\frac{1}{4}$	25 80
$\frac{7}{8}$ ".....	$2\frac{1}{2}$	$1\frac{1}{4}$	18 90	$1\frac{3}{8}$ ".....	5	$2\frac{1}{2}$	27 00
$\frac{7}{8}$ ".....	3	$1\frac{1}{2}$	19 80	$1\frac{3}{8}$ ".....	$5\frac{1}{2}$	$2\frac{3}{4}$	28 50
$\frac{7}{8}$ ".....	$3\frac{1}{2}$	$1\frac{3}{4}$	20 70	$1\frac{3}{8}$ ".....	6	3	30 00

Unlisted intermediate sizes take a proportionate price.

Discount.....

Give the diameter of the bolt and the width of the bar on which the nut lock is to be used.

When nut locks are wanted for use on bolts which pass through the center of the bar, it is only necessary to give the width of the bar and the size of the bolt.

Where the bolt does not come in the center of the bar, give the size of the bolt and the distance from the center of the bolt to the angle, or point where the bend must be in order for the lock to secure a bearing.

CALUMET HEAVY DUTY TRACK DRILL.

Similar to the Paulus.

Fitted with the Calumet Improved Spindle.

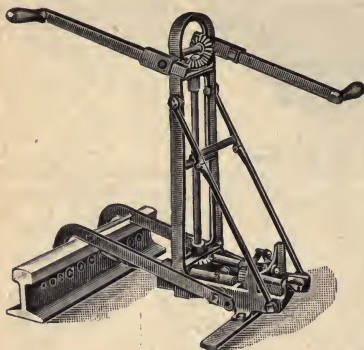


Fig. D. 185.

more holes before it becomes necessary to resharpen, and contain twice as much usable steel as found in twist bits. No water or oil required when drilling with these bits.

Unless otherwise specified, we furnish these drills with regular hooks to fasten over the rail, but we will furnish with the under clutch at the same price when required.

To set up the drill for operation, pull handle back between braces and throw the upright part of the drill down.

Throw the hooks over the rail, then straighten up the brace and bring the drill to an upright position.

Screw bit up against rail by turning small crank shown on base. Withdraw bit when hole is finished in the same way. Never turn handles backwards to withdraw bit.

To allow trains to pass pull handle of brace back, throw hooks off rail.

Weight 95 pounds.

Price, with plain chuck for twist bits and one bit.....\$20 00

Price, with **Calumet Improved Chuck** and one flat beaded bit..... 25 00

Discount.....

Track Drill Bits listed on pages 83 and 483.

This Drill is similar to the Paulus Drill except in the Spindle, all other parts being interchangeable.

We equip this drill with the **Heavy Duty Thrust Bearing Spindle** described on the opposite page, with regular, or improved Calumet chuck.

All the bearings are bronze bushed, taking up all wear in the frames and overcoming the frequent renewals so common in other makes of drills.

We use only gears made from steel drop forgings with machine cut teeth and then case hardened. These gears will outlast a great many of the ordinary iron gears used by other makers.

We recommend the use of flat beaded bits, made of high speed steel. They drill as high as 200 or

more holes before it becomes necessary to resharpen, and contain twice as much

HIGH SPEED FLAT BEADED BIT.



Fig. D. 186.
(Enlarged Cut.)

For list prices on high speed bits, see page 83.

THE CALUMET IMPROVED SPINDLE AND CHUCK.

For Flat Beaded Bit.



(Pat. applied for.)

Fig. D. 187.

All new style Calumet drills are now fitted with the Calumet improved spindle chuck and flat beaded bit, and any track drill (similar to the Paulus) now in use may be equipped at a small expense. The Calumet improved spindle is interchangeable with the standard or ordinary spindles. The change can be made by anyone, by simply loosening a small retaining nut and pulling out the old spindle and inserting the Calumet improved spindle.

CALUMET IMPROVED SPINDLE.

Heavy Duty—Thrust Bearing.

Used in the Calumet (Similar to the Paulus) Track Drill.

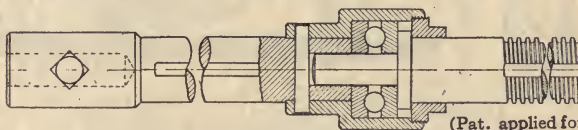


Fig. D. 188.

(Sectional View)

This Spindle is vastly superior to any other design on the market. Its simplicity and strength appeal at once to the mechanic. No set screws to work loose. Larger sized balls. Special tool steel ball race. Can be applied to all track drills that are similar to the Paulus.

CALUMET IMPROVED CHUCK.

The Calumet Improved Chuck is so constructed that flat beaded bits can be used down to $2\frac{1}{4}$ inches.

Prices of Calumet Improved Spindle and Chuck, with Beaded Bit.

Spindle and chuck.....	\$6 00
Spindle and chuck, complete, with feed screw (See Fig. D. 187).....	7 25
Spindle, chuck and one $\frac{1}{4}$ -inch flat beaded bit.....	7 40

Repair parts: Spindle, \$4 00; Jaws, \$1 00; Chuck Sleeve, 70c.

Discount

CALUMET TRACK DRILLS. Repair Parts—Similar to the Paulus

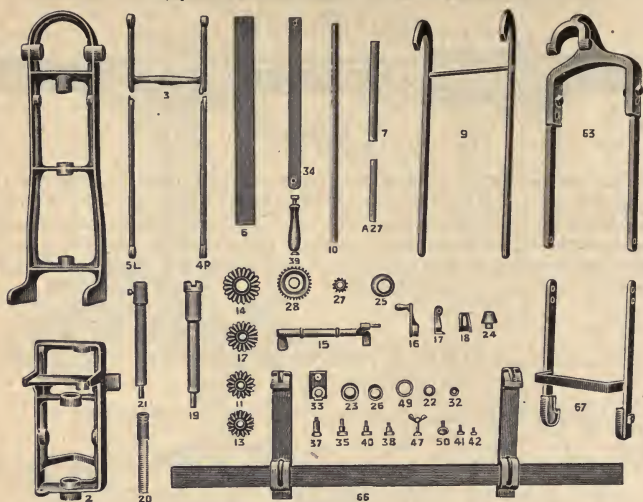


Fig. D. 189.

No.	Description	Price	No.	Description	Price
1	Upper Frame.....	\$2 50	24	Jaw for Rich Chuck.....	\$1 00
2	Lower Frame.....	2 25	25	Sleeve for Rich Chuck.....	70
3	Upper Back Bone Brace.....	75	26	Brass Bushing.....	25
4R	Lower Back Bone Brace.....	75	27	Quick Return Pinion.....	75
5L	Lower Back Bone Brace.....		27A		
6	Foot Plate.....	50	28	Ratchet Wheel.....	1 25
7	Crank Shaft.....	75	32	Ball Guide.....	25
9	Rail Hooks.....	1 25	33	Crank Hub and Thumb Screw	50
10	Vertical Shaft.....	75	50		
11	Upper Gears.....	1 00	34	Crank Lever.....	40
12	Upper Gears.....		36		
11A	Upper Gears.....	4 80	37	Special Shoulder Screw....	10
12A	Upper Gears.....		38		
13	Lower Gears.....	1 00	39	Wood Handle.....	10
14	Lower Gears.....		40	Special Screw.....	05
13A	Lower Gears.....	5 40	42	Steel Ball.....	03
14A	Lower Gears.....		47	Bolt and Wing Nut for ad-justing Feed.....	05
15	Rocker Shaft.....	75	49	Washer.....	25
16	Quick Return Handle.....	25	63	Overclutch Hook and Con-necting Links.....	3 00
17	Ratchet Feed Dog.....	25	66	Underclutch Rail Hooks and Cross Bar.....	3 25
18	Pawl Shield.....	10	67	Underclutch Cross Bar Hooks, per pair.....	3 25
19	Rich Spindle and Chuck...	6 00			
20	Feed Screw.....	1 25			
21	Standard Spindle.....	2 50			
22	Thrust Collar.....	25			
23	Ball-bearing Shield.....	25			

Discount.....

THE EUREKA "QUICK SPEED" BONDING DRILL.

(Coulter Patent)

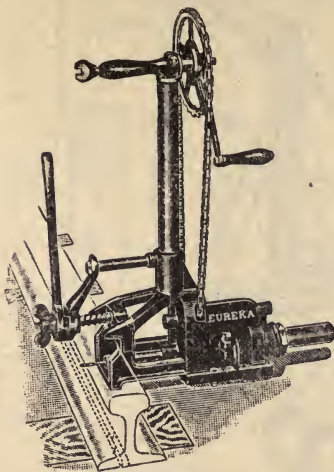


Fig. D. 190.

The introduction of higher carbon and heavier rail sections has created the demand for a stronger and more substantial bonding drill. The Eureka bonding drill meets these conditions and includes many features not to be found on other drills.

The Eureka bonding drill is clamped instantly and rigidly to the rail head by simply pressing a lever. It can be applied to old or new rail equally well and requires no blocking or leveling up as it does not come in contact with ballast or ties. This method of clamping causes the bit to advance or retreat in an absolutely straight line and saves the expense of broken bits, such as is incurred in the use of the old style drilling machines which, with their unsteady rail hooks and foot plates resting on uneven ties and ballasts, permits the $\frac{3}{8}$ -inch bits to drill off center and to pinch or break when withdrawing from the hole.

A foot lever causes the drill bit to be fed rapidly to web of rail; to be withdrawn instantly in case of approaching train, or to revolve in work without feeding in case of hole choking up with chips or encountering hard spots.

An eccentric bearing at top allows for the taking up the slack of chain and does away with the use of idlers or other friction creating devices.

The driving and reverse gears are made from bronze metal overcoming the frequent replacements required on other makes of drills and also assuring the easiest running machine possible.

There are no exposed working parts. Perfect protection from dirt and grit being provided for by entirely inclosing the feeding and reversing mechanism and by cap encasing the feed screw.

All nuts are of the same size and can be adjusted with a single wrench, which latter being screwed into the handle is always ready for use and not liable to be mislaid.

The Eureka bonding drill has a ball bearing thrust, automatic feed, quick release, bushings at wearing points, and embodies many other features which makes it a most up-to-date machine.

You will find this bonding drill a rapid working tool and, with the weight of only 32 pounds, is portable. A trial, under working conditions, will demonstrate that it will drill more holes and break fewer bits and cost you less for repairs and maintenance than any other drill on the market.

Weight, 32 pounds. Price, including one drill bit.....\$25 00

Discount.....

Bonding Drill Bits listed on pages 83 and 483.

CALUMET TRACK DRILL.

Automatic Feed. Similar to the Paulus (Old Style).

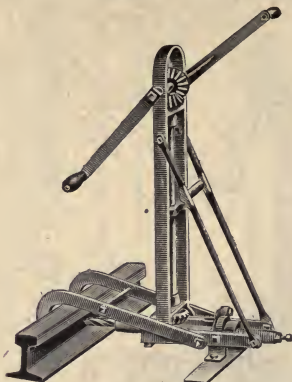


Fig. D. 192.
In Position for Drilling.

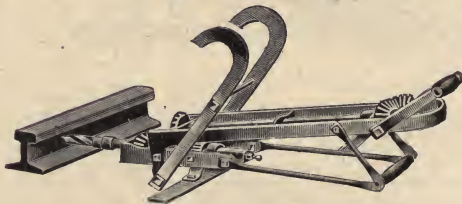


Fig. D. 193.
Thrown Back for Passing Train.

To set up the drill for operation, pull handle back between braces and throw the upright part of the drill down, as shown in lower cut.

Throw the hooks over the rail, then straighten up the brace and bring the drill to an upright position.

Screw ratchet wheel with hand, and tighten the bit up against the rail where you wish to drill the hole.

Stand on the foot plate when drilling.

Never turn the handles backward to take out the drill bit. Throw down the upright part and remove the hooks from the rail. Pull the machine back to take the bit out of the hole.

For trains to pass when drilling throw the upright part down and the hooks back.

Keep the screw in the end of feed screw set up tight to insure easy work.

It is well to have a strong solution of soap and water dropping on the bit when drilling.

Weight 60 lbs.

Price.....\$20.00

Discount.....
Track Drill Bits listed on page 83.

CALUMET TRACK DRILLS.

Repair Parts—Similar to the Paulus (Old Style).

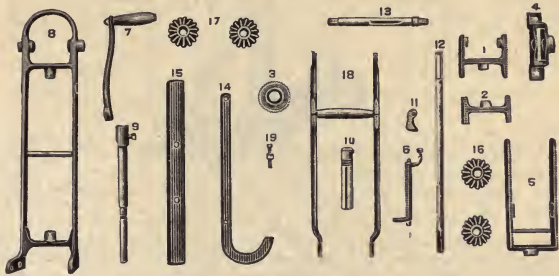


Fig. D. 194

No.	Description.	Price
1.	Upper Box, old style	\$1 00
2.	Lower Box, old style	75
3.	Ratchet Wheel	1 25
4.	Housing for Ratchet Wheel	1 50
5.	Lower Frame	1 50
6.	Rocker Shaft	75
7.	Two Cranks.....	1 00
8.	Upper Frame, new style	2 50
9.	Spindle	2 50
10.	Feed Screw	1 25
11.	Ratchet Feed Dog	25
12.	Vertical Shaft.....	1 00
13.	Crank Shaft	75
14.	Rail Hooks	1 05
15.	Foot Plate	50
16.	Two Upper Gears	1 00
17.	Two Lower Gears	1 00
18.	Back Brace	1 25
19.	Set Screw.....	10

Discount.....

MOORE TRACK DRILL.

Automatic Variable Feed

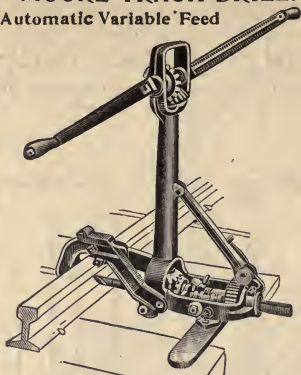


Fig. D. 195.

Equipped with a simple automatic and variable feed mechanism having a range from 1 inch to every 50 revolutions of the spindle to one in every 650, which allows the adjustment of the feed to meet all requirements. Feed may be changed while drill is in operation.

The drill is made with a detachable upright or standard. The upright is quickly erected and rigidly secured to the frame by the shifting of one lever, and is rapidly released by same lever.

The upright and rail hooks can be quickly removed to allow trains to pass and replaced, *without disturbing the drill*. It can also be easily carried by one man, one part in each hand.

Rail hook or over-clutch may be quickly lengthened for drilling through splice bars, angle bars, frogs, crossings, etc., by removing one bolt

Also fitted with combination chuck when so ordered.

No. 1.	Weight 60 pounds.....	\$20 00
No. 1.	With combination chuck and spindle.....	25 00
No. 2.	Weight 80 pounds.....	25 00
No. 2.	With combination chuck and spindle.....	30 00

$\frac{1}{4}$ -inch or smaller twist bit included at above list.

Discount.....

Track Drill Bits listed on page 83.

BELAND RAIL DRILL.

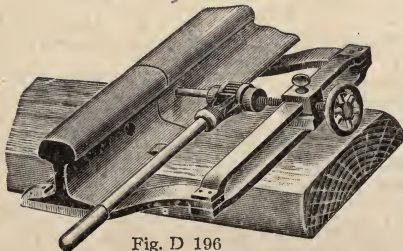


Fig. D 196

Priceeach, \$10 00

Discount.....

TRACK DRILL BITS.

Round Shank Carbon Steel Twist Drill Bits.
For Use in All Makes of Track Drills.

Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each.
$\frac{1}{32}$	\$0 90	$\frac{1}{16}$	\$1 15	$\frac{3}{32}$	\$1 70
$\frac{1}{16}$	90	$\frac{3}{32}$	1 20	1	1 80
$\frac{3}{32}$	95	$\frac{1}{8}$	1 25	$1\frac{1}{8}$	2 00
$\frac{1}{8}$	95	$\frac{3}{16}$	1 30	$1\frac{1}{4}$	2 20
$\frac{1}{4}$	1 00	$\frac{1}{2}$	1 35	$1\frac{3}{4}$	2 30
$\frac{3}{8}$	1 00	$\frac{3}{4}$	1 40	$1\frac{7}{8}$	2 40
$\frac{1}{2}$	1 05	$\frac{7}{8}$	1 45	$1\frac{5}{8}$	2 80
$\frac{3}{4}$	1 05	$\frac{15}{16}$	1 55	$1\frac{1}{2}$	3 20
$\frac{7}{8}$	1 10	1	1 60		

6 inches long. Shanks $\frac{1}{2}$ -inch diameter by $2\frac{1}{2}$ -inch long.

Discount.....

HIGH SPEED STEEL FLAT BEADED DRILL BITS.

For Use in "Calumet" (Similar to Paulus) Track Drills, with Chuck.

Also for Use in Climax Drills Fitted with Magic Chuck.

Note:—Drill bits $\frac{1}{8}$ -inch to $\frac{3}{8}$ -inch, inclusive, require jaws for the No. 1 bead.

Drill bits $\frac{1}{2}$ -inch to $1\frac{1}{2}$ -inch, inclusive, require jaws for the No. 2 bead.

Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each
$\frac{1}{16}$	\$0 95	$\frac{3}{16}$	\$1 20	1	\$1 55
$\frac{1}{8}$	95	$\frac{1}{4}$	1 25	$1\frac{1}{8}$	1 60
$\frac{3}{16}$	1 00	$\frac{5}{16}$	1 30	$1\frac{1}{4}$	1 65
$\frac{1}{4}$	1 00	$\frac{3}{8}$	1 35	$1\frac{3}{8}$	1 70
$\frac{5}{16}$	1 05	$\frac{1}{2}$	1 40	$1\frac{1}{2}$	1 75
$\frac{3}{8}$	1 10	$\frac{5}{8}$	1 45	$1\frac{3}{4}$	1 80
$\frac{1}{2}$	1 10	$\frac{7}{8}$	1 50	$1\frac{7}{8}$	1 85
$\frac{3}{4}$	1 15	1	1 52	$1\frac{1}{2}$	1 90
				$1\frac{3}{4}$	1 95

Discount.....

"MAGIC" HIGH SPEED STEEL DRILL BITS.

Flat Bit with Round Shank.

For Use in All Makes of Track Drills.

Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each.	Diameter, Inches.	Price, Each
$\frac{5}{8}$	\$2 20	$\frac{1}{8}$	\$2 90	$1\frac{1}{8}$	\$4 00
$\frac{1}{2}$	2 30	$\frac{3}{8}$	3 20	$1\frac{1}{4}$	4 40
$\frac{3}{4}$	2 70	1	3 50	$1\frac{3}{4}$	4 80
$\frac{15}{16}$	2 80	$1\frac{1}{8}$	3 70	$1\frac{1}{2}$	6 40

Discount.....

TRACK DRILL BITS FOR BONDING DRILLS.

Diameter, Inches.	Length, Inches.	Price, Each. Twist Bit.	Price, Each. High Speed Steel Flat Bit.
$\frac{1}{16}$	4	26 cents	65 cents
$\frac{1}{8}$	4	28 "	65 "
$\frac{3}{16}$	4	32 "	65 "

Discount.....

See also page 483.

“HEAVY DUTY” TRACK DRILL.

Automatic Feed.

“Climax.”

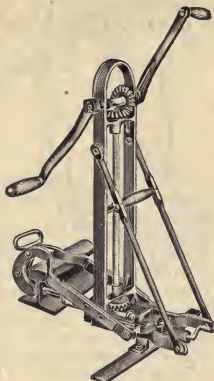


Fig. D. 198.

The exclusive features of this drill are, briefly, heavy, adjustable steel hooks that can be extended to reach over guard-rail or Weber joint, connected to the frame by $\frac{1}{2}$ -inch bolts which eliminate all danger of shearing. Fast and slow speed device so simple in operation that the greenest hand cannot fail to understand it at sight—two ratchet wheels, one coarse and the other fine; two pawls of different strokes, one for either wheel. The gears are of ductile steel *bone-hardened*. The whole drill is built for heavy wear.

The braces are much heavier than on other drills and the base is longer thus giving better support. The malleable frame is heavily ribbed at the proper points to secure the greatest strength without undue weight. All Climax drills have our patented quick-return device. The pawls may be thrown back and the bit forwarded or returned by means of the little crank in the end of the feed screw. Between the drill spindle and the feed screw is a set of tool steel balls in self-contained, dust-proof racers.

The drill collapses to clear passing trains leaving the bit in place. If desired we can furnish this machine with under-clutch in place of the hooks.

The drill is regularly furnished with usual type of spindle to take the $\frac{1}{2}$ -inch round shank twist bit, but we recommend the use of *Magic* chuck which takes in addition to the regular twist bit, the high speed flat bit. This bit will drill many times the number of holes over that of the twist bit before it becomes necessary to re-sharpen, and contains twice the amount of usable steel. No application of oil required when drilling with these bits.

In this drill the thrust is not carried on the ratchet wheels as in other drills but by a steel nut embedded in the frame. This prevents the ratchet wheel being held tightly by the thrust and reduces to a minimum the wear upon the feed device.

Price, with regular spindle.....\$25 00
Price, with Magic chuck and one Flat bit, not exceeding 1 inch in diameter .. 30 00

Discount.....

Track Drill Bits listed on page 83.

MAGIC TRACK DRILL CHUCKS.



Fig. D. 199.

This chuck fits into our Climax drills in place of the regular spindle, but can be made to fit any make of drill at slight expense. It holds and centers either the high speed flat bit or the ordinary twist bit with round shank. The bits are held between jaws which are tightened by the sleeve instead of by a set screw as in the ordinary spindle.

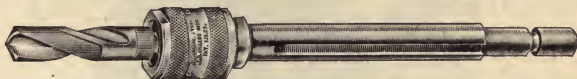


Fig. D. 200.

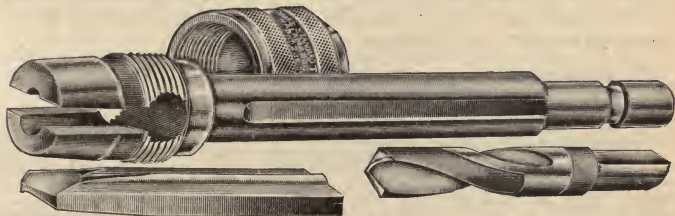
It is but little larger than the ordinary spindle and does not add to the weight of the machine. The sleeve holds the bit perfectly yet the slightest turn releases the bit.



Fig. D. 201.

High speed flat bits used in our Magic chuck require no shanks (see cut below). The nature of high speed steel is such that a shank weakens the bit. In the Magic chuck the bit is materially strengthened by being held rigidly between the jaws. Flat bits without shanks are cheaper than those with shanks, and can be moved forward when worn thus getting the maximum use.

The jaws are an integral part of the chuck and can not lose out. The flat bits are centered by the small-grooved jaw and the twist bits by the large-grooved one. This and other features are protected by letters patent. The flat bits may be moved forward as they wear until practically the entire bit is used. The butt end of the bit is supported by a small lug with a lip which fits into the opening (as shown in cut) takes the thrust and holds bit firmly in the chuck

Fig. D. 202.
(Enlarged Cut).

Price.....each, \$5.00

Discount.....

For list prices of Magic High Speed Bits see page 83.

"C. A. RAILROAD SPECIAL" TOOL GRINDER.

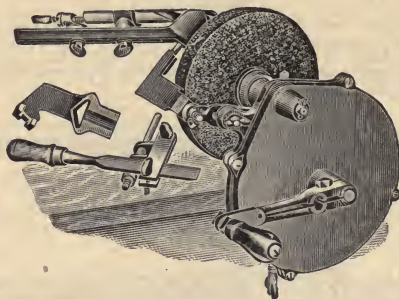


Fig. D. 203.

The twist bit grinding attachment is used for accurately sharpening any twist bit, and works perfectly with smallest or largest sizes. Proper clearance is always given the bit. The bit on the vulcan is sharpened by swinging it back and forth in the bracket.

Attachment for grinding flat bits is adjustable so that it enables the operator to get the proper clearance, or backing, to the cutting edge.

It will take plane irons and chisels up to 2½-inch and is so designed that it slides back and forth parallel to face of wheel.

Each of these grinders is equipped as follows:

- One twist bit grinding attachment.
- One attachment for sharpening flat bits.
- One regular Universal tool rest.
- One combination plane iron and chisel guide.
- One 7 x 1 carborundum wheel.

Price, complete.....	each, \$10 00
Extra carborundum wheel. No. 80 or coarser.....	" 5 00

Discount.....

COOK'S "MAGIC" GRINDER.

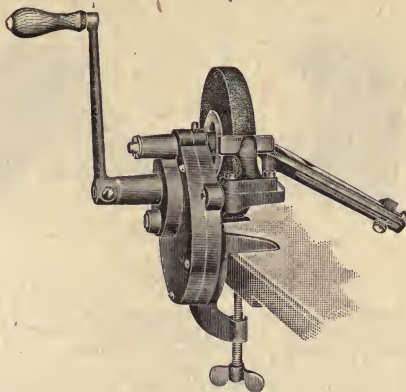


Fig. D. 204.

Track drill bits even more than other tools, must be kept properly sharpened in order to do good work and prevent undue wear on the drilling machine. This grinder in the hands of an ordinary track laborer will do its work perfectly, there being no adjustments.

The Magic grinder automatically sharpens either twist or flat bits, giving them exact clearance, center and cutting edge. The bit is simply placed in the holder and swung to and fro against the cutting wheel which revolves at very high speed.

The gears in this grinder are machine-cut and run in a bath of oil. The pinions for carrying the cutting wheel are very heavy— $\frac{3}{4}$ inch in diameter. They run in bronze bushings. The machine clamps direct to bench or hand car. Clamp opens to four inches.

The Magic grinder is regularly furnished with a holder for twist bits and with an adjustable rest for grinding chisels, and other edge tools. The attachment for the flat bit is furnished for a small amount extra. Unless otherwise ordered twist bit holder only is furnished.

This grinder is ideal for track work. It is light and easily portable. This mechanism is protected from damage by the iron shell.

Price, with either bit attachment.....	\$20 00
Price, with both attachments.....	22 00

Discount.....

WRECKING FROGS.

Alexander.

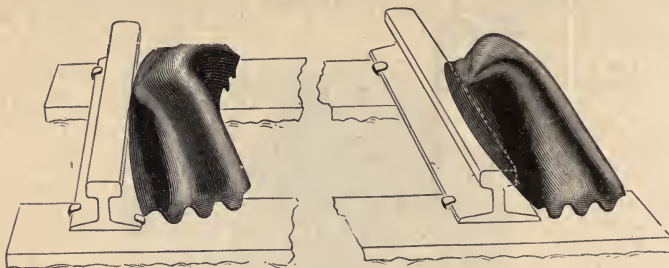


Fig. D. 205.

Made of pressed steel. To meet the heavy equipment now in use we have increased the thickness of steel and are now making them of $\frac{1}{8}$ -inches, and guarantee them to rerail the heaviest locomotives.

No. 1—Weight 164 lbs. per pair, for 6-inch rail.....	Price \$17 00
No. 2—Weight 158 lbs. per pair, for rail from $4\frac{1}{2}$ to $5\frac{1}{2}$ inches high "	16 00
No. 3—Weight 50 lbs. per pair, for any rail under $4\frac{1}{2}$ inches high "	12 00

Aldon

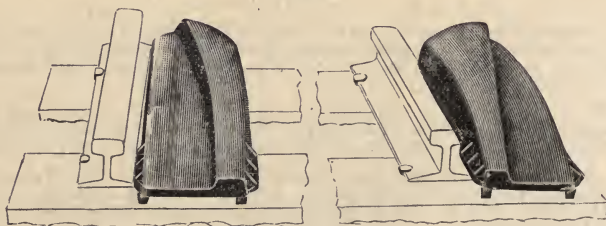


Fig. D. 206.

Frogs are marked right and left. The right frog is always placed adjacent to the right rail, the left frog to the left rail. Place the high ends as close to the rail as possible. The wings at the low end of the frogs must never be placed on top the flange of the rail.

No. 1—Weight 200 lbs. per pair, for heaviest equipment, and for rails of 100 lbs. and under	per pair \$17 00
No. 2—Weight 180 lbs. per pair, for all modern equipment, and for rails 85 lbs. and under	per pair 16 00
No. 3—Weight 100 lbs. per pair, Light Engines and cars not exceeding 35 tons, and for rails of 65 lbs. or under.....	per pair 12 00
No. 4—Weight 50 lbs. per pair, suitable for Cars, etc., not exceeding 15 tons; and for rails 30 lbs. and under.....	per pair 10 00

WRECKING FROGS.

Johnson.

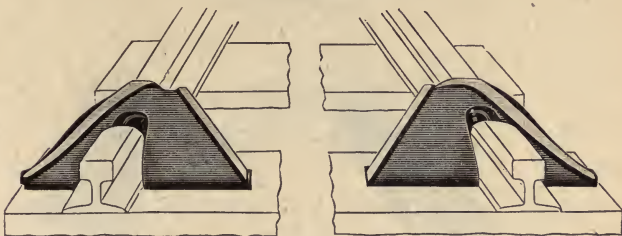


Fig. D. 207

Straddles the rails—Needs no spikes, clamps or fasteners. Rests on rail both front and rear. Adjusts itself to different heights of rail and distributes the load on the rail, *not one or two ties*.

A (Standard)	For 100-pound rail up to 5½ inches high, capacity 80 tons, weight 145 pounds.....	per pair, \$20 50
Z	For rail up to 100 pounds not over 6 inches high, capacity 100 tons, weight 165 pounds.....	per pair, 22 00
AA	For rail up to 100 pounds, not over 6 inches high, capacity 200 tons, weight 275 pounds.....	per pair, 35 00
B	For rail up to 80 pounds, not over 5 inches high, capacity 50 tons, weight 110 pounds.....	per pair, 18 50
C	For rail up to 65 pounds, not over 4½ inches high, capacity 30 tons, weight 60 pounds.....	per pair, 14 50
M	For rail 12 to 45 pounds, not over 3½ inches high, capacity 20 tons, weight 30 pounds.....	per pair, 12 00

Tilden.

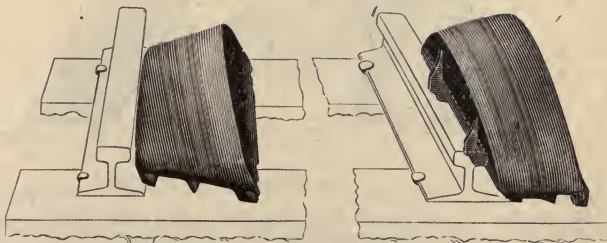


Fig. D. 208.

Giant Special, with clamps.....	per pair \$22 00
Improved Extra Heavy, with clamps.....	" 20 00
Small Extra Heavy, with clamps.....	" 18 00
For Motor Cars.....	" 10 00

WRECKING FROGS.

Newton Divided.

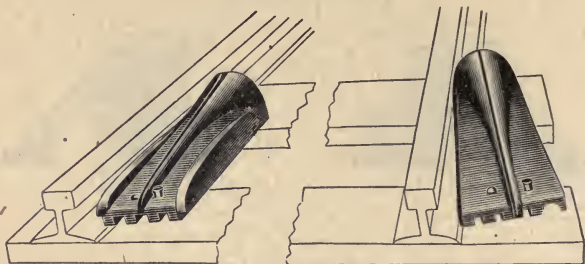


Fig. D. 209.

Each replacer is made in two pieces, which when locked and bolted together form a complete pair of replacers. When divided may be used in various combinations, and can always be used where a wheel drops between a switch point and a rail, thus protecting the switch point from being bent and the switch rendered useless.

Made of best quality cast steel. Weight, 220 pounds.....price, per pair, \$16 00

Fewing.

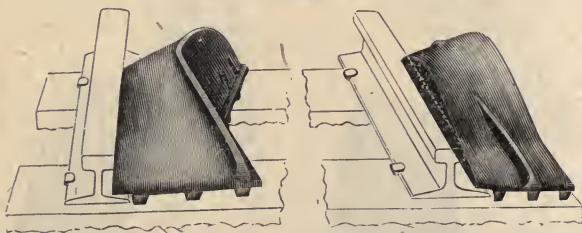


Fig. D. 210.

Is provided with caulks and also spike holes. The flanges and ribs guide the wheel to the rail. The ascent is gradual, yet the throwing power sure. It does not interfere with under-rigging of cars or locomotives.

A	Standard, weight 186 pounds per pair, and suitable for 80-pound rails and under	Price, \$16 00
B	Replacers, weight 225 pounds per pair, suitable for 100-pound rails and under	Price 18 00

DERAILERS.

**Smyth.
Hand Throw.**

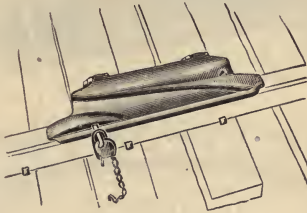


Fig. D. 211

No. 2.

Has a lip which fits over the head of the rail. Also has an extra rib parallel to the lip, adding strength and firmness. A strong, simple device, operated by hand.

No. 1.	4 feet long, weight 100 pounds, complete	each, \$12 00
No. 2.	2 feet, 8 inches long, weight 75 pounds, complete	" 10 00
No. 3.	1 foot, 8 inches long, weight 60 pounds, complete	" 8 50

Discount.....

**Freeland.
Mechanical Throw.**

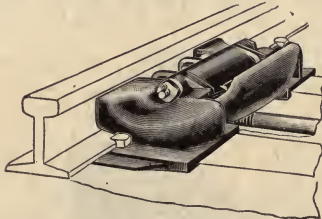


Fig. D 212.

No. 8.

Is operated by switch stand, interlocking plant or any mechanism used to throw a switch.

No. 6.	3 feet, 8 inches long, weight 185 pounds, complete	each, \$16 00
No. 7.	2 feet, 8 inches long, weight 135 pounds, complete	" 12 00
No. 8.	1 foot, 8 inches long, weight 110 pounds, complete	" 11 50

Discount.....

Always specify right or left hand; size or weight of rail, and No. of Derailer wanted.

CAR REPLACERS OR WRECKING FROGS.

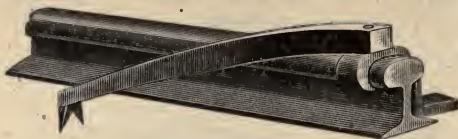


Fig. D. 213.

Per pair.....\$900

CAST STEEL SWITCHING AND WRECKING ROPE.



Fig. D. 214.

Rule for Figuring Price on Switch Ropes.

Wire Rope will be charged at regular list price and for net length; net length being the measurement between points of bearing in the thimble at each end. In ordering Switch Rope, please be careful to specify the length required from thimble to thimble as above and not the length over all, that is, from end of hook to the end of the link.

In addition to above, Fittings will be charged at the following list prices:

List Price for Switch Rope Fittings.

Diameter	1½-in.	1¾-in.	1½-in.	1½-in.	1-in.	¾-in.	¾-in.
Single.....	\$17 25	\$13 25	\$10 00	\$ 9 50	\$7 00	\$6 75	\$4 00
*Double.....	21 25	16 75	13 00	12 00	9 00	8 50	5 50

* Two links on each end.

Discount.....

RAIL BRACES.

Pressed Steel.

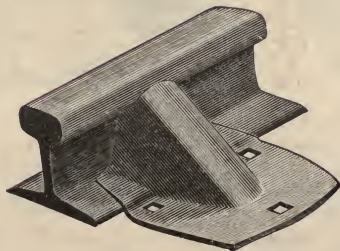


Fig. D. 215.

Price.....each, \$

SURFACE CATTLE GUARDS.

"National."

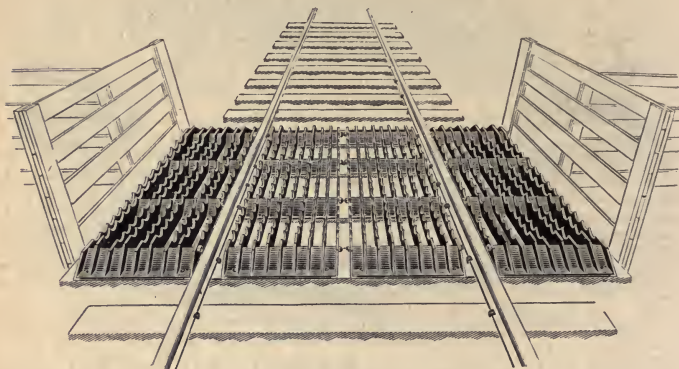


Fig. D. 217.

No. 3.

This guard can be laid on the ordinary 8 x 10 in. x 8 ft. track tie, and being composed of only four sections, is readily adjusted, thereby saving much of the cost of installing, as is the case with guards of many parts. It presents a neat appearance and cost of maintenance is but slight.

Is unequaled for effective protection against cattle, horses, sheep, hogs, etc., the guard being constructed of steel strips of alternate heights, $2\frac{1}{2}$ and $3\frac{1}{2}$ inches respectively, and $2\frac{1}{2}$ inches apart, serrated on upper edges full length, sufficient to deter the most unruly animal from advancing yet without inflicting injury. Another important feature of this guard is that the serrated steel strips are allowed a certain amount of play. When the animal steps upon them, the strips vibrate, causing the animal to recede quickly, a feature lacking in guards having a flat or broad surface and fastened securely to the ties.

Sections are so constructed as to be protected against displacement by dragging chain hooks or brake beams.

No. 3. Width 10 feet, length 8 feet, 8 inches (four sections).....\$21 00

No. 4. Width 10 feet, length 8 feet, 8 inches (four sections)..... 17 50

No. 5. Any width or length required (Standard size, four sections)..... 13 00

The No. 5 is made of $1\frac{1}{2}$ x $1\frac{1}{2}$ inch angle steel, $\frac{3}{8}$ or $\frac{1}{2}$ inch thick, alternate height bars $2\frac{1}{2}$ inches apart. Takes the place of the wood guard and will last many years. Neat, strong, durable.

No. 8. Width 10 feet, length 8 feet, 8 inches (four sections).....\$16 50

Of a severe type, this guard is recommended for protection against specially unruly animals.

No. 9. Width 10 feet, length 8 feet, 8 inches (four sections).....\$15 50

Constructed of $1\frac{1}{2}$ x $1\frac{1}{2}$ x $\frac{3}{8}$ inch angles, serrated full length and both edges inverted $2\frac{1}{2}$ inches apart. Very effective, strong and inexpensive.

Discount.....

COOK HOT BOX COOLER.

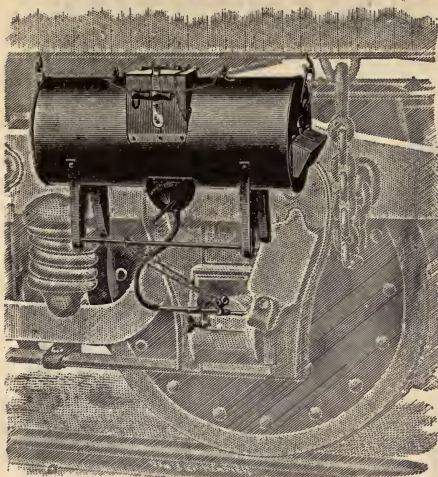


Fig. D. 218.

to the face of the revolving bearing and prevents the oil from throwing the water off. The upward and inward motion of the axle draws a portion of the water between the rubbing faces, and this does what the oil has failed to do; it keeps the faces apart by forming a cushion of water between them. This lubricates the journal, stops metal contact and friction. More water being discharged under the lip of the brass than can pass between the faces, there is a backward flow of the surplus water down the upward moving face of the bearing which carries the heated oil with it, thereby keeping it away from the meeting faces.

This forms a complete water-bearing which stops the friction, overcomes the heat, reduces expansion, prevents the journal cutting or crystallizing, grinds away the foreign substances which have been stuck to the face of the bearings by the heat and pressure, restores the axle smooth to nearly, if not quite the same condition it was in before being heated. It will cool any hot box in any condition of heat under any circumstances. If the cooler is properly adjusted, in running from fifteen to twenty-five miles it will bring the journal back to its normal bearing and leave it straight, smooth and serviceable, without delay to the train or injury to the axle. The use of the cooler will avoid the necessity of removing brasses until they are worn out.

The action of water as applied by the Cook Cooler on the revolving over-heated bearing acts the same in keeping it free from scale and bright and smooth as does the application of water on the surface of hot iron or steel when it is being forged under a trip hammer.

Sent on trial if desired.

Price each \$15 00

Discount

The Cook Cooler cools hot boxes by forcing water between the heated rubbing faces. Water will not stick to the greasy face of the journal, but by this method it is held there and carried between the heated faces in contact. The water is discharged at the center of the bearing above the oil and waste on the cone of friction immediately under the overhanging lip of the brass. The recess that is formed at the edge of the meeting faces of the axle and brass holds the water down

THE DUDGEON UNIVERSAL HYDRAULIC JACK.

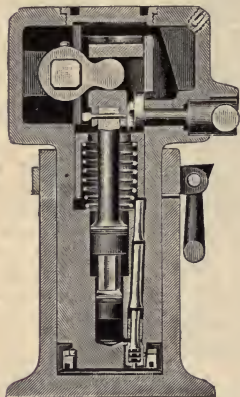


Fig. D. 219.

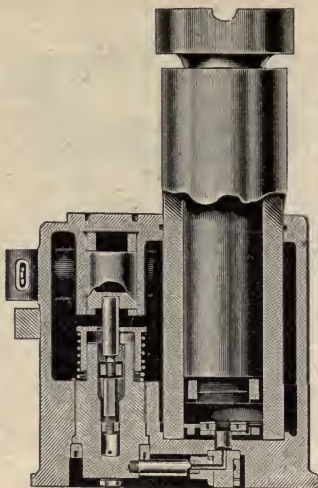


Fig. D. 220.

Showing Construction of Two Typical Forms of the Universal Jack.

The new Universal Jack, which is shown by the two sectional views above, embodies features never before used in hydraulic jacks, which combine to make it the simplest and most efficient jack on the market.

It has double pumps, so that if the load is light, or if the ram must be extended some distance before the strain commences, the two pumps can be used together until the strain becomes excessive, when one pump is thrown out by a turn of the handle. Reversing the operation throws both pumps into service again.

This jack may be lowered either by the lever or by the valve handle, and it can be furnished upon request to lower by either method alone. It requires but one pressure valve for both pumping and lowering. It neither requires an additional pressure valve, or valves, on account of its double pump (which has heretofore been the case), nor does it require an additional pressure valve (which has also heretofore been the case) for lowering.

This jack is lowered by the operator's pressing all the valves from their seats by the lever or valve handle, as he may desire, since all the valves are combined in a single valve chamber in a superimposed position, and all are forced off their seats together. The superimposed valves and pistons are new and desirable features, as any valve or either piston may fail and the jack continue in operation to its maximum capacity.

DUDGEON'S UNIVERSAL HYDRAULIC JACKS.



Fig. D. 221

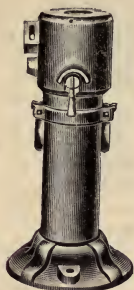


Fig. D. 222.



Fig. D. 223.

Plain jack for use in presses or where there is a firm foundation or support.

Railroad jack for work where stability and portability are required.

Base jack for railroad work or where a broad base insuring stability is required.

Tons Lift.	Run Out Inches.	Plain Jack.			Railroad Jack.			Base Jack.		
		Height Inches.	Weight Pounds.	Price.	Height Inches.	Weight Pounds.	Price.	Height Inches.	Weight Pounds.	Price.
10	12	25	80	\$ 80	25	105	\$ 90	25	109	\$ 95
10	18	32	98	95	31½	146	100	31	125	110
15	12	26	102	100	25	135	115	25	135	125
15	18	32	120	125	31	155	140	32	158	150
20	12	26	127	120	26	167	140	26	168	150
20	18	33	155	145	33	203	165	32	227	175
30	9	22	146	150	21	190	160	22	210	170
30	12	26	194	175	26	206	185	27	271	200
30	18	33	260	210	32	255	220	33	310	235
40	12	27	280	210	27	265	220	27	340	240
40	18	34	320	240	32	310	260	35	392	280
50	12	28	333	240	28	374	250	28	427	260
50	18	33	374	290	33	350	300	36	491	310
60	12	28	350	290	27	320	300	39	508	310

Discount.....

DUDGEON'S UNIVERSAL HYDRAULIC JACKS.



Fig. D. 224.

For general use and for work that will not permit the head to be placed under the load.



Fig. D. 225.

Independent claw jack for work where stability and a low lift are required.

Fixed Claw Jack.

Independent Claw Jack.

Lift.	Run Out.	Height.	Weight.	Price.	Lift	Run Out.	Height.	Diameter of Base.	Weight of Jack with Claws.	Weight of Jack without Claws.	Price.
Tons.	Ins.	Ins.	Lbs.		Tons.	Ins.	Ins.	Ins.	Lbs.	Lbs.	
10	12	25	125	\$100	10	12	26	11	155	105	\$ 95
10	18	32	144	120	10	18	32	11	195	125	110
15	12	26	162	150	15	12	26	11	195	135	135
15	18	32	190	185	15	18	32	11	210	155	160
20	12	26	203	200	20	12	27	12	252	170	175
20	18	33	245	240	20	18	33	12	295	190	200
30	9	22	290	225	30	9	22	12	270	190	190
30	12	26	310	250	30	12	27	12	330	213	220
30	18	32	364	285	30	18	33	13	385	260	260
40	12	27	355	300	40	12	27	13	380	270	260
40	18	34	460	325	40	18	33	13	465	315	300
50	12	27	450	325	50	12	28	15	530	379	300
.....	.....	.....	.....	.....	50	18	33	15	580	480	350
.....	.....	.....	.....	.....	60	12	28	16	625	460	350

Discount

DUDGEON'S UNIVERSAL HYDRAULIC JACKS. CAR INSPECTOR'S JACKS.



Fig. D. 226.
Plain Type.

Lift Tons.	Run Out Inches.	Height Inches.	Size of Round Base, Inches.	Weight Pounds.	Price.
15	5	11	6	48	\$ 80 00
20	5	11	7	58	100 00
25	4	11	7½	76	115 00
30	5	11	8	89	130 00

Discount.....

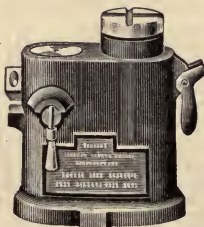


Fig. D. 227.
Low Type.

Lift Tons.	Run Out Inches.	Height Inches.	Size of Elliptical Base, Inches.	Weight Pounds.	Price.
7	5	11	9 x 6	56	\$ 75 00
10	5	11	9½ x 6½	70	90 00
15	5	11	9½ x 6½	90	120 00
20	5	11	10½ x 8	105	135 00
25	5	11	11½ x 8½	115	145 00
30	5	11	11½ x 9	125	155 00

Discount.....

DUDGEON'S UNIVERSAL HYDRAULIC JACKS.

Horizontal Double Pump Jack with Re-enforced Cistern and Removable Claw.

This is the latest improved type of horizontal claw Jack and is intended for lifting both on the ram head in the usual manner and also by means of the claw where a low lift close to the ground is necessary. It is provided with a specially designed cistern which not only gives a support and guide to the claw but also prevents the crushing of the cistern either by the load on the claw or by the strain coming on the front of the cistern by reason of the load. The larger claw Jacks only are made in this form, as this feature is not required for the smaller sizes

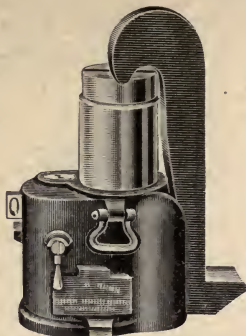


Fig. D. 228.

Lift Tons.	Run Out Inches.		Horizontal Double Pump Jack with Grooved Head and Without Claw.				Horizontal Double Pump Jack With Re-enforced Cistern and Removable Claw.				
			Height, Inches.	Size of Elliptical Base, Inches.	Weight, Pounds.	Price, Each.	Height, Inches.	Size of Elliptical Base, Inches.	Weight without Claw, Pounds.	Weight with Claw, Pounds.	Price, Each.
30	12	21½		13 x10	258	\$200	21	15 x11	290	351	\$240
30	18	27		13 x10	314	235	28	15 x11	350	433	285
40	12	22		14 x11	314	240	22	15½ x11	332	418	290
40	18	28		14 x11	355	280	28	15½ x11	370	480	340
50	12	22		15 x11½	345	260	23	16 x11½	414	534	320
50	18	29		16½ x12½	512	310	28	16 x11½	475	565	380
60	9	19		16½ x12½	450	250	19	18 x12½	485	607	310
60	12	22		16½ x12½	550	275	23	18 x12½	590	718	340
60	18	28		16½ x12½	600	350	30	18 x12½	650	771	420
80	9	20		17½ x14½	550	310	21	19½ x14½	565	684	360
80	12	25		17½ x14½	655	335	24	19½ x14½	665	795	390
80	18	30		17½ x14½	725	385	31	19½ x14½	740	891	455
100	9	21		20½ x16½	720	375	22	22 x16	735	946	400
100	12	24		20½ x16½	876	400	25	22 x16	820	1042	475
100	18	32		20½ x16½	1065	475	32	22 x16	1025	1268	550
125	9	22		21 x17	850	425	...	...	...	...	...
125	12	25		21 x17	900	450	...	...	...	...	...
125	18	32		21 x17	1150	525	...	...	...	...	...
150	12	26		23 x18	1165	500	...	...	...	...	...
150	18	33		23 x18	1325	575	...	...	...	...	...
200	12	27		24 x20	1200	600	...	...	...	...	...
200	18	34		24 x20	1500	700	...	...	...	...	...
250	12	28		27 x24	1700	725	...	...	...	...	...
250	18	35		27 x24	2000	850	...	...	...	...	...

Discount.....

DUDGEON'S UNIVERSAL HYDRAULIC JACKS.

Oval Base Horizontal.

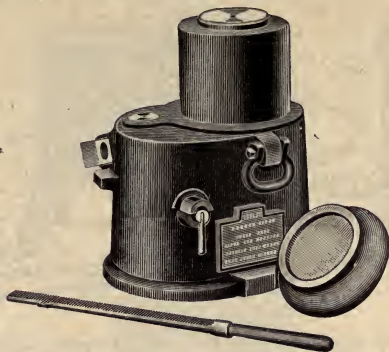


Fig. D. 229.
Removable Cap on Kam.

Lift, Tons.	Run Out, Inches.	Height With Cap, Inches.	Height Without Cap, Inches.	Size of Elliptical Base, Inches.	Weight, Pounds, Without Cap.	Price.
30	12	21 $\frac{1}{2}$	20	13 x10	250	\$200
30	18	27	25 $\frac{1}{2}$	13 x10	306	235
40	12	22	20 $\frac{1}{2}$	14 x11	304	240
40	18	28	26 $\frac{1}{2}$	14 x11	345	280
50	12	22	20 $\frac{1}{2}$	15 x11 $\frac{1}{2}$	335	260
50	18	29	26 $\frac{1}{2}$	16 $\frac{1}{2}$ x12 $\frac{1}{2}$	500	310
60	9	19	17 $\frac{1}{2}$	16 $\frac{1}{2}$ x12 $\frac{1}{2}$	435	250
60	12	22	20 $\frac{1}{2}$	16 $\frac{1}{2}$ x12 $\frac{1}{2}$	535	275
60	18	28	26 $\frac{1}{2}$	16 $\frac{1}{2}$ x12 $\frac{1}{2}$	585	350
80	9	20	18	17 $\frac{1}{2}$ x14 $\frac{1}{2}$	530	310
80	12	25	21	17 $\frac{1}{2}$ x14 $\frac{1}{2}$	635	335
80	18	30	27	17 $\frac{1}{2}$ x14 $\frac{1}{2}$	705	385
100	9	21	19	20 $\frac{1}{2}$ x16 $\frac{1}{2}$	700	375
100	12	24	22	20 $\frac{1}{2}$ x16 $\frac{1}{2}$	856	400
100	18	32	28	20 $\frac{1}{2}$ x16 $\frac{1}{2}$	1035	475
125	9	22	19	21 x17	830	425
125	12	25	22	21 x17	880	450
125	18	32	28	21 x17	1125	525
150	12	26	22	23 x18	1135	500
150	18	33	28	23 x18	1295	575
200	12	27	23	24 x20	1175	600
200	18	34	29	24 x20	1475	700
250	12	28	24	27 x24	1675	725
250	18	35	30	27 x24	1975	850

Discount.....

DUDGEON'S UNIVERSAL HYDRAULIC JACKS.

With Short Independent Cylinder and Ram.

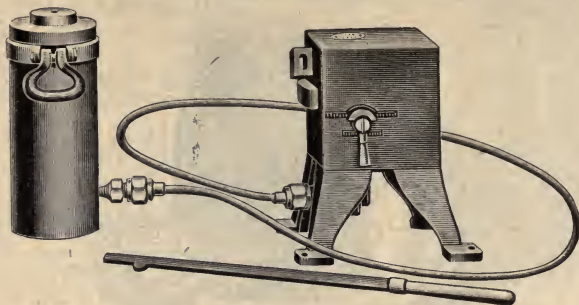


Fig. D. 230.

This type of jack is intended for use in boiler furnaces, under ships, in subway construction, and in other confined places. The cylinder and ram are made as short as possible, and this type is therefore not recommended for lifting a live load because of the short length of ram remaining in the cylinder when it is fully run out. This is the most simple, efficient and reliable independent double pump jack on the market. The pump and cylinder are connected by a flexible copper pipe, 12 feet long, which is included in the price of the jack.

Gauges showing pressure per square inch in pounds, and total pressure on the ram in tons, and provided with a safety check valve, will be furnished, attached for \$25.00, net, extra.

Also made to lift a live load.

Prices on application.

DUDGEON'S UNIVERSAL HYDRAULIC RAILROAD TRAVERSING JACK.



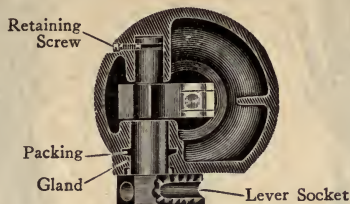
Fig. D. 231.

Traversing jack with railroad type of base.

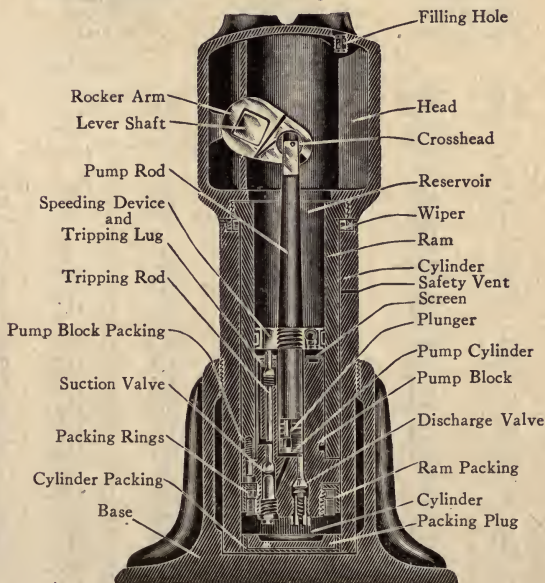
Lift.	Run Out.	Height of Jack.	Height of Jack and Bed.	Weight.	Price.
Tons.	In.	In.	In.	Lbs.	
10	12	25	30	250	\$145
15	12	25	30	275	175
20	12	26	31	330	215
30	12	26	31	425	270
40	12	26	31	450	310

Discount.....

JOYCE'S HYDRAULIC JACK.



Horizontal Section Through Head.



Vertical Section.

Fig. D. 232.

Showing construction and names of parts.

Order repairs by above names, giving size and style of Jack.

JOYCE'S HYDRAULIC JACKS.

Fig. D. 233.
Plain Jacks.Fig. D. 234.
Base Jacks.

Capacity, Tons.	Rise, Inches.	Plain Jacks.			Base Jacks.		
		Height When Down, Inches.	Weight, Lbs.	Price.	Height When Down, Inches.	Weight, Lbs.	Price.
4	6	17 $\frac{1}{2}$	43	\$ 38 00	.....	.....	.....
4	12	23 $\frac{1}{2}$	51	42 00	23 $\frac{1}{2}$	60	\$ 50 00
4	18	29 $\frac{1}{2}$	59	46 00	29 $\frac{1}{2}$	68	55 00
4	24	35 $\frac{1}{2}$	67	50 00	35 $\frac{1}{2}$	74	61 00
7	6	18 $\frac{1}{2}$	47	39 00	.....	.....	.....
7	9	21 $\frac{1}{2}$	51	43 00	21	69	51 00
7	12	24 $\frac{1}{2}$	63	45 00	24	75	54 00
7	18	29 $\frac{1}{2}$	75	51 00	29 $\frac{1}{2}$	87	61 00
7	24	36 $\frac{1}{2}$	87	57 00	36	99	68 00
10	6	19 $\frac{1}{2}$	72	43 00	19 $\frac{1}{2}$	81	51 00
10	9	22 $\frac{1}{2}$	76	47 00	22 $\frac{1}{2}$	89	56 00
10	12	25 $\frac{1}{2}$	84	50 00	25 $\frac{1}{2}$	97	61 00
10	18	31 $\frac{1}{2}$	98	58 00	31 $\frac{1}{2}$	112	69 00
10	24	37 $\frac{1}{2}$	114	65 00	37 $\frac{1}{2}$	128	78 00
15	12	25 $\frac{1}{2}$	105	63 00	25 $\frac{1}{2}$	125	76 00
15	18	32 $\frac{1}{2}$	120	75 00	32 $\frac{1}{2}$	137	90 00
15	24	38 $\frac{1}{2}$	140	87 00	38 $\frac{1}{2}$	163	104 00
20	9	22 $\frac{1}{2}$	108	72 00	22 $\frac{1}{2}$	100	87 00
20	12	25 $\frac{1}{2}$	121	79 00	25 $\frac{1}{2}$	129	94 00
20	18	33	147	94 00	33	161	112 00
20	24	39 $\frac{1}{2}$	171	109 00	38 $\frac{1}{2}$	181	130 00
30	9	24 $\frac{1}{2}$	159	102 00	24 $\frac{1}{2}$	189	114 00
30	12	26 $\frac{1}{2}$	166	106 00	26 $\frac{1}{2}$	205	126 00
30	18	33 $\frac{1}{2}$	215	127 00	33 $\frac{1}{2}$	230	152 00
30	24	39 $\frac{1}{2}$	253	148 00	39 $\frac{1}{2}$	265	178 00
40	9	24 $\frac{1}{2}$	161	111 00	24 $\frac{1}{2}$	191	132 00
40	12	27 $\frac{1}{2}$	180	124 00	27 $\frac{1}{2}$	214	147 00
40	18	33 $\frac{1}{2}$	222	148 00	33 $\frac{1}{2}$	249	178 00
40	24	40	272	177 00	40	294	208 00
60	9	24 $\frac{1}{2}$	201	123 00	24	228	148 00
60	12	27 $\frac{1}{2}$	225	140 00	27	240	165 00
60	18	33 $\frac{1}{2}$	277	174 00	33	264	200 00

Discount.....

JOYCE'S HYDRAULIC JACKS.



Fig. D. 235..

Ground Lift Jack.

Capacity Tons.	Rise Inches	Height when down—Inches.	Weight Lbs.	Price.
4	12	23½	60	\$ 52 00
4	18	29½	76	58 00
4	24	35½	88	63 00
7	12	24½	78	56 00
7	18	29½	95	64 00
7	24	36½	113	71 00
10	12	25½	115	63 00
10	18	31½	153	72 00
10	24	37½	172	82 00
15	12	25½	135	79 00
15	18	32½	165	94 00
15	24	38½	192	108 00
20	12	25½	155	99 00
20	18	33½	191	117 00
20	24	39½	229	135 00
30	12	27½	236	132 00
30	18	33½	281	158 00
30	24	39½	331	185 00
40	12	27½	236	154 00
40	18	33½	288	186 00
40	24	40	344	216 00
60	12	27½	295	175 00

Discount.....

JOYCE'S HYDRAULIC JACKS.

For Light Duty.

Outside Pump Jacks.



Fig. D. 236.

Capacity Tons.	Rise Inches.	Height when down-Inches	Weight Pounds.	Price Single Pump.	Extra for Ground Lift.
4	6	11	35	\$ 45 00	\$ 5 00
4	12	17	78	52 00	5 00
4	18	22 $\frac{1}{2}$	90	59 00	5 00
4	24	28 $\frac{1}{2}$	105	65 00	5 00
7	6	11	74	47 00	6 00
7	9	14 $\frac{1}{2}$	81	51 00	6 00
7	12	17 $\frac{1}{2}$	82	54 00	6 00
7	18	23 $\frac{1}{2}$	102	61 00	6 00
7	24	29 $\frac{1}{2}$	116	68 00	6 00
10	6	11	75	51 00	6 00
10	9	15 $\frac{1}{2}$	86	56 00	7 00
10	12	18 $\frac{1}{2}$	95	61 00	8 00
10	18	24 $\frac{1}{2}$	113	69 00	10 00
10	24	30 $\frac{1}{2}$	131	78 00	12 00
15	6	11 $\frac{1}{2}$	94	61 00	6 00
15	9	15 $\frac{1}{2}$	106	69 00	11 00
15	12	18 $\frac{1}{2}$	120	76 00	12 00
15	18	24 $\frac{1}{2}$	142	90 00	14 00
15	24	30 $\frac{1}{2}$	166	104 00	16 00
20	6	12 $\frac{1}{2}$	97	77 00	14 00
20	9	15 $\frac{1}{2}$	118	87 00	16 00
20	12	18 $\frac{1}{2}$	133	94 00	18 00
20	18	24 $\frac{1}{2}$	165	112 00	20 00
20	24	30 $\frac{1}{2}$	188	130 00	24 00

Discount.....

JOYCE'S HYDRAULIC JACKS.

For Heavy Duty.

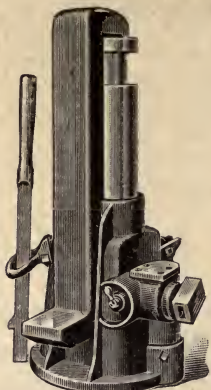


Fig. D. 237.

Outside Pump Jacks.

Double Pump Type.

When the small handle to the right of the ground lift slide is turned straight up, both pumps will operate, giving the Jack great speed which can be used to advantage in working the Jack up to a load, or under a light load.

When the load is heavy, turn this handle straight down. The high pressure pump only, will then be in operation, and the full capacity of the Jack will be attained, at a proportionally less speed.

Capacity Tons.	Rise Inches.	Height When Down Inches.	Weight Pounds.	Price Single Pump.	Price Double Pump.	Ground Lift Extra.
30	6	13 $\frac{1}{2}$	184	\$102 00	\$132 00	\$14 00
30	9	16 $\frac{1}{2}$	204	114 00	144 00	15 00
30	12	20 $\frac{1}{2}$	241	126 00	156 00	16 00
30	18	25 $\frac{1}{2}$	259	152 00	182 00	18 00
30	24	31 $\frac{1}{2}$	304	178 00	208 00	20 00
40	6	14 $\frac{1}{2}$	200	117 00	147 00	16 00
40	9	17 $\frac{1}{2}$	222	132 00	162 00	18 00
40	12	20 $\frac{1}{2}$	244	147 00	177 00	20 00
40	18	26 $\frac{3}{4}$	288	178 00	208 00	24 00
40	24	32 $\frac{3}{4}$	332	208 00	238 00	28 00
60	9	18 $\frac{1}{2}$	268	161 00	191 00	22 00
60	12	20 $\frac{1}{2}$	313	175 00	205 00	24 00
60	18	26 $\frac{3}{4}$	353	200 00	230 00	28 00
80	9	18 $\frac{1}{2}$	357	193 00	223 00	25 00
80	12	21	394	208 00	238 00	28 00
80	18	27 $\frac{1}{2}$	469	236 00	266 00	34 00
100	9	19 $\frac{1}{2}$	450	212 00	252 00	29 00
100	12	22 $\frac{1}{2}$	495	236 00	276 00	32 00
100	18	29 $\frac{1}{2}$	596	272 00	312 00	38 00
150	9	20	500	344 00	380 00	36 00
150	12	23	550	370 00	410 00	40 00
150	18	30 $\frac{1}{2}$	750	422 00	462 00	48 00
200	12	25	750	450 00	490 00	48 00

Screw release, \$10.00 extra.

Discount.....

LOCOMOTIVE AND CAR JACK SCREWS.



Fig. D. 238.

Diam. of Screw.	Height of Stand.	Height Over All.	Lifting Capacity.	Price.	Diam of Screw.	Height of Stand.	Height Over All.	Lifting Capacity.	Price.
1 1/4 in.	4 in.	6 1/2 in.	10 tons	\$2 90	2 1/4 "	10 "	14 "	24 "	\$ 8 25
1 1/2 "	6 "	8 1/2 "	10 "	3 10	2 1/2 "	12 "	16 1/2 "	24 "	9 00
1 3/4 "	8 "	11 "	10 "	3 40	2 3/4 "	14 "	18 "	24 "	10 00
1 7/8 "	10 "	13 "	10 "	3 80	3 "	16 "	20 1/2 "	24 "	11 00
2 "	12 "	14 1/2 "	10 "	4 20	3 1/4 "	18 "	22 1/2 "	24 "	12 00
2 1/4 "	14 "	16 1/2 "	10 "	4 60	3 1/2 "	20 "	24 1/2 "	24 "	13 25
2 1/2 "	4 "	7 "	12 "	3 25	3 3/4 "	22 "	26 1/2 "	24 "	14 50
2 3/4 "	5 "	8 "	12 "	3 50	4 "	24 "	28 1/2 "	24 "	15 75
3 "	6 "	9 1/2 "	12 "	3 75	4 1/4 "	6 "	10 1/2 "	28 "	7 75
3 1/4 "	8 "	11 1/2 "	12 "	4 25	4 1/2 "	6 1/2 "	10 3/4 "	28 "	8 00
3 1/2 "	10 "	13 1/2 "	12 "	4 75	4 3/4 "	8 "	12 1/2 "	28 "	8 75
3 3/4 "	12 "	15 1/2 "	12 "	5 25	5 "	10 "	14 1/2 "	28 "	9 75
4 "	14 "	17 1/2 "	12 "	6 00	5 1/4 "	12 "	16 "	28 "	10 75
4 1/4 "	16 "	19 1/2 "	12 "	6 75	5 1/2 "	14 "	18 "	28 "	12 00
4 1/2 "	6 "	9 3/4 "	16 "	4 50	5 3/4 "	16 "	20 1/2 "	28 "	13 25
4 3/4 "	8 "	11 3/4 "	16 "	5 00	6 "	18 "	22 1/2 "	28 "	14 50
5 "	10 "	13 3/4 "	16 "	5 75	6 1/4 "	20 "	24 1/2 "	28 "	15 75
5 1/4 "	12 "	15 3/4 "	16 "	6 25	6 1/2 "	22 "	26 1/2 "	28 "	17 00
5 1/2 "	14 "	17 3/4 "	16 "	6 75	6 3/4 "	24 "	28 1/2 "	28 "	18 25
5 3/4 "	16 "	19 3/4 "	16 "	7 50	7 "	26 "	30 "	28 "	20 00
6 "	18 "	21 1/2 "	16 "	8 50	7 1/4 "	28 "	32 1/2 "	28 "	22 00
6 1/4 "	5 "	9 "	20 "	5 00	7 1/2 "	30 "	34 "	28 "	24 00
6 1/2 "	6 "	10 "	20 "	5 25	7 3/4 "	32 "	36 1/2 "	28 "	26 00
6 3/4 "	8 "	12 "	20 "	6 00	8 "	3 "	13 "	36 "	17 50
7 "	10 "	14 1/2 "	20 "	6 75	8 1/4 "	14 "	19 "	36 "	19 50
7 1/4 "	12 "	16 "	20 "	7 50	8 1/2 "	16 "	21 "	36 "	20 75
7 1/2 "	14 "	18 "	20 "	8 25	8 3/4 "	18 "	23 "	36 "	22 00
7 3/4 "	16 "	19 1/2 "	20 "	9 25	9 "	20 "	25 1/2 "	36 "	23 25
8 "	18 "	22 "	20 "	10 25	9 1/4 "	22 "	27 1/2 "	36 "	24 50
8 1/4 "	20 "	24 "	20 "	11 50	9 1/2 "	24 "	29 1/2 "	36 "	25 75
8 1/2 "	22 "	26 "	20 "	12 50	9 3/4 "	26 "	31 "	36 "	27 00
8 3/4 "	24 in.	28 in.	20 tons	13 50	10 "	28 "	33 "	36 "	28 50
9 "	6 "	10 1/2 "	24 "	7 00	10 1/4 "	30 "	34 1/2 "	36 "	30 00
9 1/4 "	8 "	12 "	24 "	7 50	10 1/2 "	36 "	41 "	36 "	36 00

Discount.....

Levers will be sent only when ordered, and will be charged extra.

BELL BASE RATCHET JACK SCREWS.



Fig. D. 239.

With wrought iron screw, cast iron stand and cap, and steel ratchet, pawl and handle.

Size.	Height of Stand.	Height Over All.	Rise of Screw.	List Price.	Size.	Height of Stand.	Height Over All.	Rise of Screw.	List Price.
Inches.	Inches.	Inches.	Inches.		Inches.	Inches.	Inches.	Inches.	
2 x10	6	10	3	\$15 50	2½ x16	10	16	6½	\$21 50
2 x12	8	12½	5	16 00	2½ x18	12	18	8½	22 50
2 x14	10	14½	7	16 75	2½ x20	14	26	10½	23 50
2 x16	12	16½	9	17 50	2½ x22	16	22	12½	24 50
2 x18	14	18½	11	18 25	2½ x24	18	24	14½	25 50
2 x20	16	20½	13	19 00	2½ x26	20	26	16½	26 50
2 x22	18	22½	15	19 75	2½ x28	22	28	18½	27 75
2 x24	20	24½	17	20 50	2½ x30	24	30	20½	29 00
2 x26	22	26½	19	21 50	2½ x34	28	34	24½	33 00
2 x28	24	28½	21	22 50	2½ x36	30	36	26½	35 00
2 x30	26	30½	23	23 50	2½ x38	32	38	28½	37 00
2½ x12	8	12½	4½	18 00	2½ x20	14	20	10	27 50
2½ x14	10	14½	6½	19 00	2½ x24	18	24	14	30 00
2½ x16	12	16½	8½	20 00	2½ x28	22	28	18	32 50
2½ x18	14	18½	10½	21 00	2½ x30	24	30	20	34 00
2½ x20	16	20½	12½	22 00	2½ x36	30	36	26	40 00
2½ x22	18	22½	14½	23 00	2½ x42	36	42	32	46 00
2½ x24	20	24½	16½	24 00	3 x20	14	20	9½	32 00
2½ x26	22	26½	18½	25 00	3 x24	18	24	13½	35 00
2½ x28	24	28½	20½	26 00	3 x26	20	26	15½	37 00
2½ x30	26	30½	22½	27 00	3 x28	22	28	17½	38 50
2½ x12	6	12	2½	19 50	3 x30	24	30	19½	40 00
2½ x14	8	14	4½	20 50	3 x36	30	36	25½	48 00

TRIPOD RATCHET JACK SCREWS.

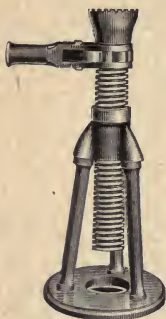


Fig. D. 240.

Size.	Height of Stand.	Height Over All.	Rise of Screw.	List Price.	Size.	Height of Stand.	Height Over All.	Rise of Screw.	List Price.
In.	In.	In.	In.		In.	In.	In.	In.	
2½x12	8	12½	4	\$47 00	2½x20	16	22	12	\$62 50
2½x14	10	14½	6	48 00	2½x22	18	24	14	63 75
2½x16	12	16½	8	49 00	2½x24	20	26	16	65 00
2½x18	14	18½	10	50 00	2½x26	22	28	18	66 25
2½x20	16	20½	12	51 00	2½x28	24	30	20	67 50
2½x22	18	22½	14	52 00	2½x30	26	32	22	68 75
2½x24	20	24½	16	53 00	2½x36	32	38	28	73 00
2½x12	8	14	4	53 50	3 x18	14	20	9½	65 50
2½x14	10	16	6	54 50	3 x20	16	22	11½	67 00
2½x16	12	18	8	55 50	3 x22	18	24	13½	68 50
2½x18	14	20	10	56 50	3 x24	20	26	15½	70 00
2½x20	16	22	12	57 50	3 x26	22	28	17½	71 50
2½x22	18	24	14	58 50	3 x28	24	30	19½	73 00
2½x24	20	26	16	59 50	3 x30	26	32	21½	74 50
2½x26	22	28	18	60 75	3 x36	32	38	27½	79 00
2½x28	24	30	20	62 00	3 x38	34	40	29½	80 50
2½x30	26	32	22	63 25	3 x40	36	42	31½	82 00
2½x36	32	38	28	67 00	3 x44	40	46	35½	85 00
2½x18	14	20	10	61 25	3 x48	44	50	39½	88 00

Discount.....

These Tripod Jack Screws have wrought iron screws, legs and bases, brass nuts and steel ratchets pawls and handles.

RATCHET CARRYING JACK SCREWS.

This Jack has a steel base, brass nuts and wrought iron screws and legs. The ratchets, pawls and handles are made of steel and malleable iron.

Length of lifting screw, 18 inches; traverse screw, 18 inches.

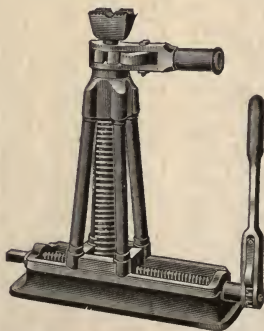


Fig. D. 241.

Capacity, 36 tons.

Diameter of Lifting Screw, 2½ in.; height over all, 26 in. \$140 00

Discount.....

HOUSE-RAISING SCREWS.

Cast Iron.

These Screws are cast with seamless threads, which makes them very smooth and uniform.

Diameter of Screw.	Height Over All.	Size of Plate.	Size of Nut.	List Price.
3 in.	18 in.	6 in. square	6 in. long	\$3 25
3 "	20 "	6 " " "	6 " " "	3 50
3 "	22 "	6 " " "	6 " " "	3 75
3 "	24 "	6 " " "	6 " " "	4 00
3 "	26 "	6 " " "	6 " " "	4 25
3 "	28 "	6 " " "	6 " " "	4 50
3 "	30 "	6 " " "	6 " " "	4 75
3 "	32 "	6 " " "	6 " " "	5 00
3 "	34 "	6 " " "	6 " " "	5 25
3 "	36 "	6 " " "	6 " " "	5 50



Fig. D. 242.

Discount.....

Wrought Iron.

LIFTING CAPACITY.

1 1/4 inch Screw will raise	16 tons.
2 1/4 " " " "	20 " "
2 1/2 " " " "	24 " "
2 3/4 " " " "	28 " "
3 " " " "	32 " "
3 1/4 " " " "	36 " "

These Screws are made of wrought iron with cast iron nuts and caps.



Fig. D. 243.

Diameter of Screws.	Height Over All	Price.	Diameter of Screws.	Height Over All	Price.	Diameter of Screws.	Height Over All	Price.
1 1/4 in.	12 in.	\$4 80	2 in.	24 in.	\$8 40	2 1/4 in.	28 in.	\$11 10
1 1/2 "	14 "	5 10	2 "	26 "	8 80	2 1/2 "	12 "	8 50
1 3/4 "	16 "	5 40	2 "	28 "	9 20	2 3/4 "	14 "	9 00
1 1/2 "	18 "	5 70	2 1/4 "	12 "	7 50	2 1/2 "	16 "	9 60
1 3/4 "	20 "	6 00	2 1/2 "	14 "	7 90	2 3/4 "	18 "	10 20
2 "	12 "	6 00	2 1/2 "	16 "	8 30	2 3/4 "	20 "	10 80
2 "	14 "	6 40	2 1/2 "	18 "	8 80	2 3/4 "	22 "	11 30
2 "	16 "	6 80	2 1/2 "	20 "	9 30	2 3/4 "	24 "	11 49
2 "	18 "	7 20	2 1/2 "	22 "	9 80	2 3/4 "	26 "	12 90
2 "	20 "	7 60	2 1/2 "	24 "	10 30	2 3/4 "	28 "	12 00
2 "	22 "	8 00	2 1/2 "	26 "	10 70	2 3/4 "	30 "	13 40

Discount.....

JOYCE'S LEVER JACKS.



Fig. D. 244.
Plain Ratchet Jack.

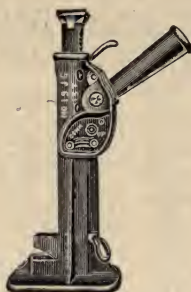


Fig. D. 245-1. No. 19 J. C.
Full Automatic Jack.

The frame and holding pawl are malleable iron. The bar forged steel and the pinion a crucible steel casting. The pins machinery steel ground to size and hardened. The teeth in the bar and pinion are milled and hardened.

All wearing surfaces are hardened steel.

No. Jack.	Height when down inches.	Rise of bar inches.	Size of bar (sq.) inches.	Weight of Jack Pounds.	Capacity Tons.	Price.
1a	16	8½	1½	24	2	\$10 00
2a	18½	10	1½	28	2	10 00
3	11½	4	1½	27	4	10 00
4	22½	14	1½	37	4	16 00
4a	18½	10½	1½	37	4	16 00
4e	41½	35	1½	60	4	22 00
4f	36	30	1½	55	4	20 00
6	26½	14	2	92	15	26 00
7	35	25½	2	115	15	30 00
10	27	16	1½	76	10	23 00
10a	22½	11½	1½	63	10	23 00

Discount

No. 19 J. C. Full Automatic Jack.

This jack has been prepared by means of some economical methods of manufacture to meet a demand for a low-priced jack without sacrificing any of the essential features of durability afforded by our standard models.

Similar in construction to Fig. D. 246-1 (see opposite page).

No. Jack	Height When Down.	Rise of Bar.	Size of Bar. Square.	Weight.	Capacity.	Price.
19 J. C.	26½-in.	16-in.	2-in.	95 lbs.	15 tons.	\$16 00

Discount

JOYCE'S LEVER JACKS.

Automatic Track Jack.



Fig. D. 246.

Designed to meet the special requirements of railroad work. It can be easily and very quickly tripped and the mechanism is of the simplest kind. The operation of raising the load is the same as in the plain lever jack, but instead of having the pawl fall in place by gravity, it is in this case actuated by a spring.

There is a small lug at the back end of the retaining pawl which can be pressed with the foot or hand, thus throwing the retaining pawl out of gear.

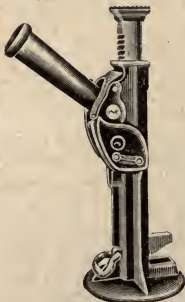
The ease with which the jack can be tripped and removed is of especial value in getting out of the way of approaching trains. The base is so shaped that it readily fits in between ties.

No.	Height When Bar is Down.	Rise of Bar, Inches.	Size of Bar (Square.)	Weight of Jack.	Capacity.	Price.
92	22½ in.	14	1½ in.	42 lbs.	10 tons.	\$16 00
94	27 "	16	1½ "	80 "	15 "	23 00

Discount.....

Full Automatic.

A strong, reliable jack in which the load can be either raised or lowered notch by notch with equal facility, by simply shifting a small lever on the outside of frame. Under no condition is there any chance for load to drop.



Number of Jack.	Height of Bar When Down, Inches.	Rise of Bar, Inches.	Size of Bar Square Inches.	Weight Pounds.	Capacity Tons.	Price.
66	13½	6½	1½	33	4	\$10 00
67	16	8	1½	34	4	11 00
68	19	11	1½	39	4	12 00
*74 Journal Jack	11	5	1½	35	10	14 00
76	22½	14½	1½	54	10	16 00
80	22	10	1½	80	12	20 00
81	27	15	1½	88	12	23 00
84	22	12	2	90	15	25 00
85	26½	16	2	105	15	26 00
86	36	25	2	128	15	30 00

Fig. D. 246-1. *This jack is shortened for journal box work; the foot and cap are omitted.

Discount.....

FULL AUTOMATIC LEVER TRUCK JACKS.

The No. 225 Jack is used for raising trucks of palace and sleeping cars after they have been run out from under the cars, for the purpose of repairs or inspection.

Two jacks are used, one being placed on each side, just within the end pedestal, with the foot of the jack under the truck frame. The truck can now be raised to the full height necessary, without blocking, and will remain safely supported by the jack, as the bar of this jack is always locked. The foot is of sufficient length and so shaped that it will hold the truck frame, and the center pair of wheels can be rolled out from between the jacks.

The No. 220 Street Car Jack is similar to No. 225, but is lighter and designed especially for raising street car bodies for the purpose of changing trucks, and is the most convenient tool made for this kind of work.

Two jacks are required. A beam is passed under the drawbar of the car and a jack is placed under each end with the beam resting on the feet. The car is raised to a sufficient height and a trestle placed on each side to support it. The jacks are then removed to the other end, which is raised in the same manner, and left on the jacks until it is desired to lower it, when the operation is reversed.

For this class of service the automatic feature is of special advantage, as there are no cams or pawls to be looked after, and one man can use both hands on the lever arm.



No. 225.
Fig. D. 246-2.

	Jack No.	
	220	225
Height of Jack, Inches.....	50	72
Height of Foot when Down, Inches.....	9½	25
Rise of Bar, Inches.....	36	43
Size of Bar, Inches Square.....	1¾	2
Weight of Jack, Pounds.....	131	270
Capacity, Tons.....	6	12
Price.....	\$40 00	\$60 00

Discount.....

AUTOMOBILE JACKS.

Joyce XX Century.

This jack is exceptionally light and compact, is full automatic, and built for lifting runabouts and touring cars. It weighs only eleven pounds, and can be conveniently carried in the tool box, but is absolutely safe at its greatest rise. A safety stop prevents raising the bar to a dangerous height. The reversing lever is always locked in either the raising or lowering position, and is out of the way so that it is not liable to be touched, thus accidentally tripping the jack.

The top of this jack has a swivel head so that it can be set and operated from any direction. The outer end of the operating lever forms a convenient tire tool.

The No. 66 jack is heavier than the XX Century and suitable for heavy motor and wagon use.

The No. 68 is still heavier, and suited for use with commercial automobiles.



Fig. D. 246-3.

No. of Jack	Height of Bar When Down, Inches	Rise of Bar, Inches	Size of Bar, Inches	Weight, Pounds	Capacity, Tons	Price, Each
62....	11½	6½	1 x ½	11	1	\$ 5 00
66....	13½	6½	1¼ x 1¼	33	4	10 00
68....	19	11	1¼ x 1¼	39	4	12 00
74....	11	5	1½ x 1½	35	10	14 00
76....	22¼	14¼	1½ x 1½	54	10	16 00
80....	22	10	1¾ x 1¾	80	12	20 00
81....	27	15	1¾ x 1¾	88	12	23 00
84....	22	11	2 x 2	90	15	25 00
85....	26½	16	2 x 2	105	15	26 00
86....	36	25	2 x 2	128	15	30 00

Discount.....

The Buckeye Automatic.

The No. 0 is a double-acting jack, raising the load on both upward and downward strokes of the lever; all other styles are single-acting, raising the load on the downward stroke only.

Drop-forged steel pawls and racks with machine cut teeth.

The load cannot be accidentally dropped.

They operate at any angle.

The Nos. 0 and 05 intended for the heaviest touring cars with 30-inch to 36-inch wheels.

The No. 03 for light runabouts and light touring cars up to 3000 pounds. Designed especially for the many new light touring cars now on the market.

Metal handles furnished when desired.



Fig. D. 246-4.

	Capacity	Height Bar Down	Rise of Bar	Height Bar Up	Weight	Size of Base	List Price
No. 0	1 ton	12"	6"	18"	9 lbs.	3¾"x5¾"	\$ 5 00
No. 05	1 ton	12"	6"	18"	9 lbs.	3¾"x5¾"	5 00
No. 03	1800lbs.	10"	6"	16"	5 lbs.	2⅝"x4½"	3 50
No. 7	2½ ton	11¼"	6½"	18"	16 lbs. with formed metal handle		10 00
No. 08	1 ton	10"	6"	16"	6 lbs.	.....	3.00
No. 09	1 ton	11⅞"	7¼"	19⅞"	7 lbs.	.....	4.00
* No. 13	3 ton	14¼"	7½"	20½"	26½ lbs.	.....	15 00
* No. 14	5 ton	14¼"	7½"	20½"	33 lbs.	.....	16 00

*The Nos. 13 and 14 also provided with foot lift.

Discount.....

JOYCE'S GEARED SCREW JACKS.

Simplest Possible Construction.

Highest Practical Speed Consistent With Screw Jack Safety.

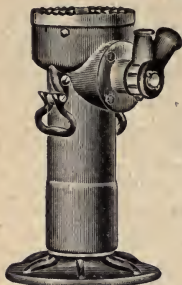


Fig. D. 247.
Round Base.

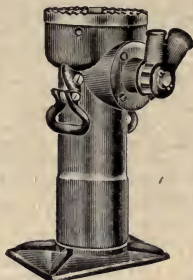


Fig. D. 247-1.
Square Base.

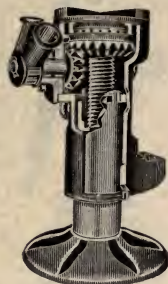


Fig. D. 247-2.
With Ground Lift.

The material used in the construction of these jacks consists of nickel chrome steel, vanadium steel, machinery steel and aluminum bronze. All parts accurately machined, requiring no adjustment in assembling. The nut has side play, so that when any side play occurs it is taken by the housing and standard, leaving the screw perfectly free and the load uniformly distributed on the threads of the nut.

All interior parts are so locked that they cannot work or jar loose, and yet can be easily taken apart through the top of the jack for repairs or inspection.

The sleeve at its lower end is equipped with a packing which forms a tight joint with the standard, permitting the entire jack to be filled with oil, in which the gears, screw, and all bearings run.

The pinion shaft and the top of the screw revolve in hardened steel bearings of ample dimensions to insure long life.

Screw threads are milled of bracket form and properly proportioned to render them of uniform strength from base to end.

Capacity, Tons.	Height when Down, Ins.	Rise, Ins.	Diam. of Screw, Ins.	Round Base.			Square Base.			*With Ground Lift.		
				No.	Weight, Lbs.	Price, Each.	No.	Weight, Lbs.	Price, Each.	No.	Weight, Lbs.	Price, Each.
25	22	13	2	154RB	114	\$ 60 00	154SB	114	\$ 60 00	154GL	119	\$ 60 00
25	26	17	2	155RB	128	70 00	155SB	128	70 00	155GL	133	70 00
25	34	25	2	156RB	157	75 00	156SB	157	75 00	156GL	162	75 00
35	20	11	2 1/2	157RB	161	80 00	157SB	161	80 00	157GL	168	80 00
35	22	13	2 1/2	158RB	172	86 00	158SB	172	86 00	158GL	180	86 00
35	24	15	2 1/2	159RB	183	92 00	159SB	183	92 00	159GL	191	92 00
35	27	18	2 1/2	160RB	200	100 00	160SB	200	100 00	160GL	208	100 00
35	30	21	2 1/2	161RB	217	105 00	161SB	217	105 00	161GL	225	105 00
35	33	24	2 1/2	162RB	234	117 00	162SB	234	117 00	162GL	242	117 00
50	20	9 1/2	2 1/2	163RB	200	113 00	163SB	200	113 00	163GL	210	113 00
50	24	13 1/2	2 1/2	164RB	220	113 00	164SB	220	113 00	164GL	230	113 00
50	27 1/2	17	2 1/2	165RB	243	125 00	165SB	243	125 00	165GL	253	125 00
50	31	21	2 1/2	166RB	267	135 00	166SB	267	135 00	166GL	277	135 00
50	38	28	2 1/2	168RB	314	160 00	.....	.....	.....	.....	.....	.....
70	27	14 1/2	3	170RB	288	160 00	170SB	288	160 00	170GL	300	160 00

*The ground lift jacks are also called bridge jacks.

Discount.....

JOYCE'S DOUBLE MOVEMENT AND TELESCOPE JACKS.

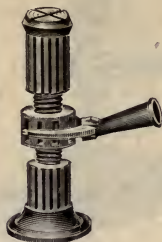


Fig. D. 248.
Nos. 12 to 17.

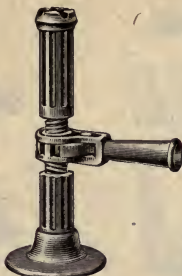


Fig. D. 249.
Nos. 19 to 23.



Fig. D. 250.
Nos. 44 to 50.

Numbers.	Height When Down.	Rise of Screw.	Diam. of Screw.	Weight of Jack.	Capacity.	With Forked Lever Ratchet.	With 6-Way Head.	With Spring Ratchet.
12	10-in.	4-in.	2 in.	21 lbs.	12 tons	\$10 00	\$ 8 00	\$15 00
13	12 "	6 "	2 "	23 "	12 "	10 00	8 00	15 00
14	13 "	7 "	2 "	25 "	12 "	10 00	8 00	15 00
15†	13 "	7 "	2 "	23 "	12 "	10 00	8 00	15 00
16	16 "	10 "	2 "	33 "	12 "	17 00	15 00	22 00
17	20 "	13 "	2 "	38 "	12 "	18 00	16 00	23 00
18*	19 "	8 "	2 "	50 "	12 "	20 00	.....	25 00
19	16 "	9 "	2½ "	47 "	25 "	.....	17 00	25 00
20	20 "	12 "	2½ "	60 "	25 "	.....	22 00	30 00
21	24 "	16 "	2½ "	70 "	25 "	.....	27 00	35 00
21½	36 "	24 "	2½ "	85 "	25 "	.....	37 00	45 00
22	27 "	18 "	3 "	123 "	50 "	.....	35 00	45 00
23	33 "	24 "	3 "	145 "	50 "	.....	40 00	50 00
44	8 "	8 "	.....	18 "	6 "	.....	12 00	17 00
45	12 "	12 "	.....	31 "	8 "	.....	15 00	23 00
47	18 "	18 "	.....	65 "	10 "	.....	20 00	28 00
50	16 "	16 "	.....	149 "	25 "	.....	53 00	65 00

These Jacks work twice as rapidly as the single screw, and from the fact that the friction which in a single screw occurs under the cap, in this Jack is distributed over the surface of the thread in the Upper Nut, thus greatly reducing the ratio of friction, it requires no more power to operate than the single screw.

The screw thread on these Jacks is half square and half V, with square side to the load. This makes a bracket thread which, in connection with the material of the screw, is exceedingly strong and durable.

*With square base and ground lift.

†With small base.

Discount.....

JOYCE'S TRAVERSING JACKS.



Fig. D. 251.
Nos. 35 and 41.

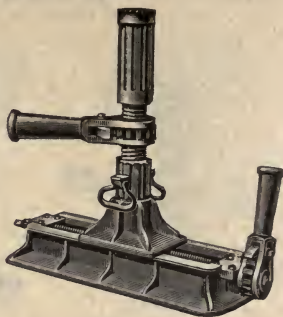


Fig. D. 252.
Nos. 36 and 42.

No. Jack.	Height of Jack, Down, Inches.	Height of Base.	Rise of Screw Inches.	Horizontal Movement, Inches.	Weight Jack, Pounds.	Capacity Tons.	Price With Spring Ratchet.	Price With Six-Way Head.
37	15	3½	10	15	137	8	\$ 65 00	.....
37a	15	3½	10	15	115	8	.....	\$ 55 00
60	18	3½	14	15	149	15	75 00	.....
60a	18	3½	14	15	135	15	.....	63 00
35	27	3½	10	15	172	25	75 00	67 00
41	30½	4½	11	15	300	50	150 00	140 00
36	23	3½	10	15	143	25	63 00	55 00
42	26	4½	12	15	280	50	125 00	115 00

Discount.....

TRAVERSING BASES.

No.	Horizontal Movement.	Size of Plate.	Weight.	Capacity.	Price.
40	15-in.	10x12-in.	90 lbs.	25 tons	\$40 00
43	15 "	13x13 "	180 "	50 "	60 00

All of above Jacks have Ratchet Handle on Traversing Bases.

Nos. 35 and 41 have Rapid Moving Screw and Ratchet Lever.

" 36 and 42 have Double Movement Screw and Ratchet Lever.

" 37-A and 60-A have Telescope Screw and Six-Way Heads.

" 37 and 60 have Telescope Screw and Ratchet Lever.

No. 40, Base may be had with 24-in. Horizontal Movement, Price, \$65.00.

Discount.....

JOYCE JOURNAL SCREW JACKS.



Fig. D. 253.



Ten pounds lighter than any other jack of similar capacity. The load is supported on roller bearings. Screw is of the bracket type, which offers high resistance to shearing stress. Parts are so arranged that a man can raise the rated capacity at the greatest possible speed.

No.	Height When Down.	Rise of Load.	Capacity.	Weight.	Price, Malleable Iron and Steel.
148	8 in.	3 in.	15 tons.	29 lbs.	\$20 00
149	9½ "	4½ "	15 "	30 "	20 00
150	11 "	6 "	15 "	34 "	20 00
151	13 "	8 "	15 "	40 "	21 00
153	10 "	5 "	25 "	65 "	50 00
163A	15 "	5 "	50 "	110 "	105 00

Discount.....



Fig. D. 254.

BELL BASE SCREW JACKS.



Fig. D. 254-1.

No.	Height When Down.	Rise Ins.	Wgt. Lbs.	Cap'y Tons.	Price.	No.	Height When Down.	Rise Ins.	Wgt. Lbs.	Cap'y Tons.	Price.
98	8-in.	4	12	4	\$ 3 50	126	22-in.	15	57	25	\$12 00
99	10 "	6	18	6	4 20	127	24 "	17	63	25	12 75
100	12 "	7	22	6	4 50	128	26 "	19	69	25	13 50
101	10 "	4½	22	12	5 00	129	28 "	21	75	25	14 25
102	12 "	6½	26	12	5 50	130	30 "	23	81	25	15 00
103	14 "	8½	30	12	6 00	132	12 "	4	49	50	12 00
111	10 "	4½	25	15	5 75	133	14 "	6	55	50	13 00
112	12 "	6	28	15	6 35	134	16 "	8	61	50	14 00
113	14 "	8	34	15	7 00	135	18 "	10	67	50	15 00
120	10 "	3½	35	25	7 50	136	20 "	12	77	50	16 00
121	12 "	5½	36	25	8 25	137	22 "	14	83	50	17 00
122	14 "	7	41	25	9 00	138	24 "	16	100	50	18 00
123	16 "	9	45	25	9 75	140	28 "	20	118	50	20 00
124	18 "	11	50	25	10 50	141	30 "	22	114	50	21 00
125	20 "	13	50	25	11 25						

Discount.....

JOYCE'S GEARED LEVER JACKS.



Fig. D. 255.



Fig. D. 256.

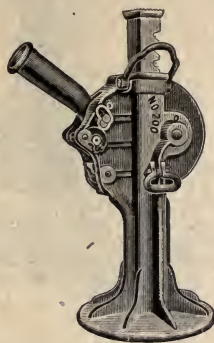


Fig. D. 257.

No. 183.

No. 180.

Nos. 194 to 202.

In these Jacks a wheel and pinion are introduced between the lever pinion and bar to multiply the power.

The Jack is automatic in raising and lowering by means of the most simple mechanism possible, consisting of but three working parts all positive in their action, viz:

A pinion to raise the load.

A retaining pawl to hold it.

And a lowering pawl to lower it.

The frame, retaining pawl and lever socket are malleable iron. The bar and bar pinion are machinery steel. The wheel, lever pinion and lowering pawl are crucible steel castings. The pins are machinery steel ground to size and hardened. All wearing surfaces are hardened steel.

Numbers.	Height When Down.	Rise of Bar.	Rise of Bar per Stroke of Lever.	Size of Bar.	Weight of Jack.	Capacity.	Price
180	11-in.	4½-in.	1-in.	2½x2-in.	73 lbs.	15 Tons	\$35 00
*183	25 "	15 "	1½ "	2½x2 "	112 "	15 "	40 00
*184	25 "	15 "	1½ "	2½x2 "	112 "	15 "	40 00
193	24 "	15 "	1½ "	2½x2½ "	134 "	20 "	50 00
194	27 "	18 "	1½ "	2½x2½ "	145 "	20 "	50 00
195	33 "	22½ "	1½ "	2½x2½ "	165 "	20 "	55 00
196	27 "	16 "	1½ "	2½x2½ "	145 "	20 "	50 00
199	22 "	12 "	1½ "	3 x2½ "	214 "	30 "	75 00
200	27 "	17 "	1½ "	3 x2½ "	218 "	30 "	75 00
201	36 "	26 "	1½ "	3 x2½ "	270 "	30 "	85 00
202	31 "	19½ "	1½ "	3 x2½ "	250 "	30 "	85 00

*Has ground foot lift.

NOTE.—No. 180 is for journal box work.

Discount.

JOYCE'S GEARED LEVER JACKS.

Full Automatic.

Fig. D. 258.
No. 295.Fig. D. 259.
No. 400.

Numbers.	Height When Down, Inches.	Rise of Bar, Inches.	Rise of Bar per Stroke of Lever, Inches.	Size of Bar, Inches.	Weight of Jack, Pounds.	Capacity, Tons.	Price.
292	22	12	$\frac{1}{2}$	$2\frac{1}{2} \times 3$	160	35	\$65 00
293	24	14	$\frac{1}{2}$	$2\frac{1}{2} \times 3$	175	35	65 00
295	27	17	$\frac{1}{2}$	$2\frac{1}{2} \times 3$	190	35	65 00
296	33	23	$\frac{1}{2}$	$2\frac{1}{2} \times 3$	215	35	70 00
297	36	26	$\frac{1}{2}$	$2\frac{1}{2} \times 3$	227	35	70 00
397	22	12	$\frac{1}{2}$	3×3	250	50	75 00
398	24	14	$\frac{1}{2}$	3×3	260	50	75 00
399	$25\frac{1}{2}$	$15\frac{1}{2}$	$\frac{1}{2}$	3×3	265	50	75 00
400	$27\frac{1}{2}$	17	$\frac{1}{2}$	3×3	268	50	75 00
401	36	26	$\frac{1}{2}$	3×3	300	50	85 00
402	31	21	$\frac{1}{2}$	3×3	282	50	85 00

Discount.....

CABLE REEL JACK SCREW.

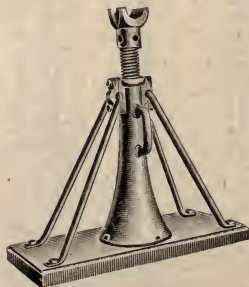
Lever will be sent only when ordered, and
will be charged extra.

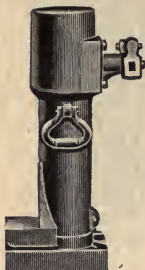
Fig. D. 260.

Diam. of Screw, Inches.	Height over all when closed, Inches.	Rise, Inches.	Capacity, Tons.	Weight about, Pounds.	Size of Base.	Price.
2	19	8	24	50	2x10x20	\$15 00
2	21	10	24	55	2x10x22	16 00
2	27	16	24	72	2x11x30	18 00
$2\frac{1}{2}$	16	4	30	47	2x11x20	16 50
$2\frac{1}{2}$	28	16	30	89	2x11x30	24 00
3	29	15	36	130	3x11x30	36 00
3	35	21	36	143	3x11x30	42 00

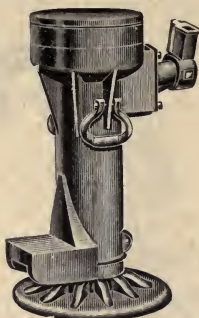
Discount.....

BALL-BEARING JACKS.

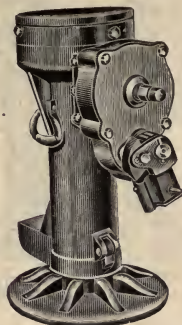
Bridge Jacks.



15 to 35-Ton.
Fig. D. 261.



50-Ton.
Fig. D. 262.



60 and 70-Ton.
Fig. D. 263.

Style.	Capacity.	Height.	Rise.	Diameter of Base.	Weight.	List Price.
1520F	15 tons	20 in.	9 in.	8x8 in.	105 lbs.	\$ 60 00
1522F	15 "	22 "	10 "	8x8 "	115 "	60 00
1524F	15 "	24 "	12 "	10 "	115 "	60 00
1526F	15 "	26 "	13 "	8x9 "	125 "	70 00
2520F	25 "	20 "	9 "	8x9 "	115 "	90 00
2522F	25 "	22 "	10 "	8x9 "	124 "	90 00
2524F	25 "	24 "	12 "	8x9 "	135 "	96 00
2526F	25 "	26 "	13 "	8x9 "	150 "	96 00
3520F	35 "	20 "	9 "	8x10 "	170 "	130 00
3522F	35 "	22 "	10 "	8x10 "	185 "	130 00
3526F	35 "	26 "	13 "	8x10 "	200 "	138 00
5024F	50 "	24 "	9 "	14 "	270 "	150 00
5026F	50 "	26 "	12 "	14 "	280 "	150 00
6026F	60 "	26 "	12 "	14 "	340 "	175 00
7026F	70 "	26 "	12 "	14 "	350 "	200 00

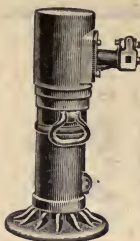
Jacks will lift one-half load on foot.

F—Indicates foot jack.

Discount.....

For list of repairs see page 28.

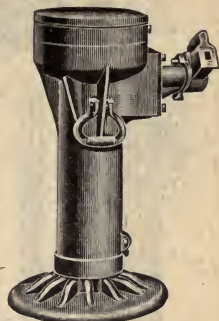
BALL-BEARING JACKS.



15 Ton.
Fig. D. 264.



25 and 35 Ton.
Fig. D. 265.



50 Ton.
Fig. D. 266.

Style.	Capacity.	Height.	Rise.	Base.	Weight.	List Price.
1520	15-ton	20 in.	9 in.	12 in. diam.	100 lbs.	\$ 60 00
1522	15 "	22 "	10 "	12 " "	110 "	60 00
1524	15 "	24 "	12 "	12 " "	120 "	65 00
1526	15 "	26 "	13 "	12 " "	125 "	70 00
1526	15 "	26 "	13 "	6x6 " "	108 "	70 00
2520	25 "	20 "	9 "	12 " "	110 "	80 00
2522	25 "	22 "	10 "	12 " "	120 "	82 50
2524	25 "	24 "	12 "	12 " "	130 "	85 00
2526	25 "	26 "	13 "	12 " "	145 "	90 00
2530	25 "	30 "	17 "	12 " "	175 "	95 00
2533	25 "	33 "	20 "	13 " "	160 "	95 00
3520	35 "	20 "	9 "	12 " "	165 "	125 00
3524	35 "	24 "	12 "	12 " "	170 "	125 00
3526	35 "	26 "	13 "	12 " "	175 "	125 00
3531	35 "	31 "	18 "	12 " "	195 "	135 00
3538	35 "	38 "	25 "	12 " "	225 "	145 00
5020	50 "	20 "	5 "	14 " "	250 "	150 00
5024	50 "	24 "	10 "	14 " "	263 "	150 00
5026	50 "	26 "	13 "	14 " "	275 "	150 00
5027	50 "	27 "	13 "	14 " "	285 "	150 00
6026	60 "	26 "	12 "	14 " "	330 "	175 00
6031	60 "	31 "	16 "	14 " "	350 "	175 00
7526	75 "	26 "	11 "	14 " "	350 "	200 00
10027	100 "	27 "	11 "	14 " "	365 "	300 00

Discount.....

For list of repairs, see next page.

BALL-BEARING JACKS—Repair Part's.

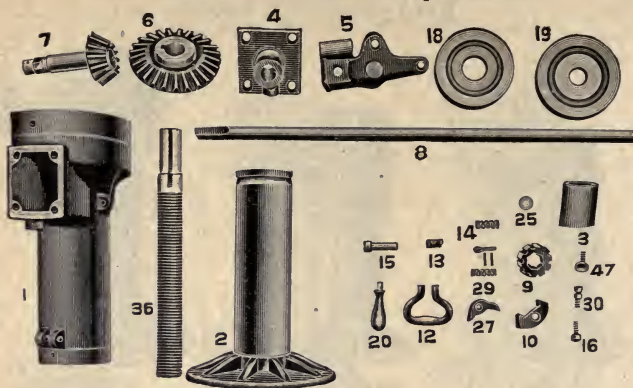


Fig. D. 266-A.

Part No.	NAME.	15-ton Jacks.	25-ton Jacks.	35-ton Jacks.	50-ton Jacks.	60 and 70-ton Jacks.
1	Shell.....	\$10 00	\$12 00	\$16 00	\$20 00	\$25 00
2	Standard.....	8 00	10 00	14 00	16 00	20 00
3	Nut.....	4 00	4 00	5 00	6 00	7 00
4	Cap or Cover.....	2 00	2 00	2 50	3 00	4 00
5	Lever Socket.....	3 00	3 00	3 50	3 50	4 00
6	Screw Gear.....	4 00	5 00	6 00	8 00	12 00
7	Stem Gear.....	4 00	5 00	6 00	8 00	.....
8	Lever.....	1 00	1 00	2 00	2 00	2 00
9	Ratchet.....	1 50	1 50	2 00	2 50	2 50
10	Lifting Pawl.....	1 50	1 50	2 00	2 50	2 50
11	Cotter Pin.....	03	03	03	03	03
12	Handle.....	25	25	25	25	25
13	Reversing Pin.....	15	15	25	25	25
14	Reversing Spring.....	05	05	05	05	05
15	Pawl Pin or Bolt.....	20	20	25	25	25
16	Cap Stud and Nut.....	15	15	15	15	15
18	Bottom Bearing Plate.....	3 00	5 00	6 00	10 00	12 00
19	Top Bearing Plate.....	3 00	5 00	6 00	10 00	12 00
25	Steel Ball.....	15	15	15	15	15
27	Stop Dog.....	25	25	25	25	25
28	Stop Dog Bolt.....	05	05	05	05	05
29	Stop Dog Spring.....	05	05	05	05	05
30	Adjusting Screw.....	10	10	10	10	10
36	Screw.....	4 00	5 00	6 00	8 00	10 00
37	Double Gear.....	.....	.....	.....	.....	26 00
38	Steel Pinion.....	.....	.....	.....	.....	7 00
42	Collar.....	.....	.....	.....	.....	1 00
47	Thumb Screw.....	10	10	10	10	10

N. B.—Shells for Foot Jacks \$2.00 higher than list prices shown.

Discount.....

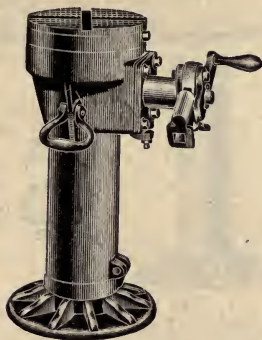
HIGH SPEED BALL BEARING JACKS.

Fig. D. 266-B.

Style.	Capacity.	Height.	Rise.	Base.	Weight.	List Price.
HS3520	35-ton	20 in.	7 in.	12 in. diam.	140 lbs.	\$145 00
HS3526	35 "	26 "	13 "	12 " "	148 "	150 00
HS3533	35 "	33 "	20 "	14 " "	190 "	160 00
HS3520F	35 "	20 "	7 "	7x9 " "	145 "	150 00
HS3526F	35 "	26 "	13 "	7x9 " "	153 "	155 00
HS5020	50 "	20 "	8 "	14 " "	215 "	175 00
HS5026	50 "	26 "	14 "	14 " "	244 "	180 00
HS5038	50 "	38 "	26 "	16 " "	310 "	220 00
HS5020F	50 "	20 "	8 "	14 " "	225 "	185 00
HS5026F	50 "	26 "	14 "	14 " "	260 "	190 00

F indicates foot jack.

Discount

For list of repairs, see next page.

HIGH SPEED BALL BEARING JACKS.

Repair Parts.

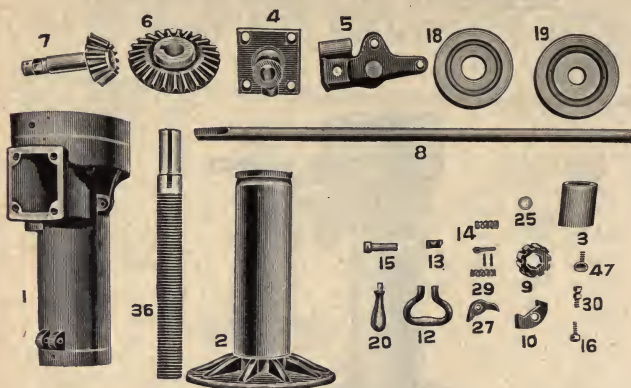


Fig. D. 266-C.

Part.	NAME.	3520 and 3526	3533	3520-F and 3526-F	5020 and 5026	5038	5020-F and 5026-F
1	Shell.....	\$20 00	\$22 00	\$23 00	\$26 00	\$34 00	\$30 00
2	Standard.....	16 00	18 00	16 00	20 00	30 00	20 00
3	Nut.....	6 00	6 00	6 00	6 00	6 00	6 00
4	Cover.....	3 00	3 00	3 00	4 00	4 00	4 00
5	Lever Socket.....	3 50	3 50	3 50	4 00	4 00	4 00
6	Screw Gear.....	7 00	7 00	7 00	10 00	10 00	10 00
7	Stem Gear.....	7 00	7 00	7 00	10 00	10 00	10 00
8	Lever.....	2 00	2 00	2 00	3 00	3 00	3 00
9	Ratchet.....	2 00	2 00	2 00	2 50	2 50	2 50
10	Lifting Pawl.....	2 00	2 00	2 00	2 50	2 50	2 50
11	Cotter Pin.....	03	03	03	03	03	03
12	Handle.....	25	25	25	25	25	25
13	Reversing Pin.....	25	25	25	25	25	25
14	Reversing Spring.....	05	05	05	05	05	05
15	Pawl Pin.....	25	25	25	25	25	25
16	Cover Stud.....	15	15	15	15	15	15
18	Bottom Bearing Plate.	7 00	7 00	7 00	12 00	12 00	12 00
19	Top Bearing Plate....	7 00	7 00	7 00	12 00	12 00	12 00
25	Steel Ball.....	15	15	15	15	15	15
27	Stop Dog.....	25	25	25	25	25	25
28	Stop Dog Pin.....	05	05	05	05	05	05
29	Stop Dog Spring.....	05	05	05	05	05	05
30	Adjusting Screw.....	10	10	10	10	10	10
36	Screw.....	7 00	9 00	7 00	10 00	14 00	10 00
47	Thumb Screw.....	10	10	10	10	10	10

Discount.....

BALL-BEARING JOURNAL JACK.

25-Ton.



Fig. D. 267.

The most economical Jack for the heaviest equipment. Having ball bearings, it is the easiest-working and most powerful Journal Jack made.

Designed especially for hard, continuous service under 80,000 and 100,000-lb. loaded cars.

Style.	Height.	Rise.	Capacity.	Weight.	List Price.
2509	9 in.	3 in.	25 tons	55 lbs.	\$56 00
2511	11 "	4 1/2 "	25 "	58 "	56 00

Discount.....

CONE BEARING RATCHET JOURNAL JACKS.



Fig. D. 268.

These Jacks are made on the same principle as the Ball-bearing Jacks, except that the load is raised by the end of the screw, which rests on a hardened steel *step*, or bushing, in the head of the sliding sleeve. Up to fifteen tons they are as good as the Ball-bearing Jacks, except that they need a little more attention in *oiling*.

Style.	Number.	Height.	Rise.	Weight.	Capacity.	List Price.
W	1509	9 1/2 in.	4 in.	43 lbs.	15 tons	\$22 00
*L	1510	10 "	4 "	35 "	15 "	22 00
K	1511	11 "	5 "	47 "	15 "	22 00

*Style L-1510 is our latest improved Journal Jack, the weight having been considerably reduced without sacrificing capacity.

Discount.....

For list of repair parts, see next page.

REPAIR PARTS FOR JOURNAL JACKS.

Figures D-267 and D-268.

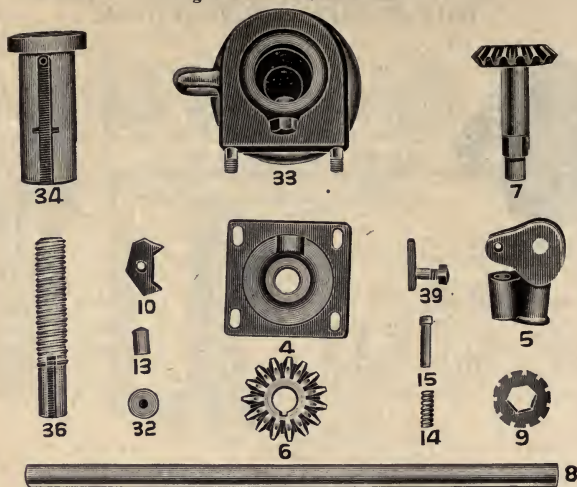


Fig. D. 269-1.

Part No.	NAME.	Cone Bearing 15-ton Jacks. (Fig. D-268.)	Ball Bearing 25-ton Jacks. (Fig. D-267.)
4	Cap or Cover.....	\$1 50	\$2 00
5	Lever Socket.....	2 00	3 00
6	Screw Gear.....	1 50	5 00
7	Stem Gear.....	1 50	5 00
8	Lever.....	75	1 00
9	Ratchet.....	1 25	1 50
10	Pawl.....	1 25	1 50
11	Cotter Pin.....	03	03
13	Reversing Pin.....	15	15
14	Reversing Spring.....	05	05
15	Pawl Bolt.....	10	10
16	Cover Stud.....	10	10
18	Bottom Bearing Plate.....		5 00
19	Top Bearing Plate.....		5 00
30	Adjusting Screw.....	10	10
32	Steel Bushing.....	25	
33	Shell.....	4 00	6 00
34	Standard.....	2 50	6 00
35	Base Plate.....	1 50	1 50
36	Screw.....	2 00	3 00
39	Key.....	25	25
44	Steel Ball.....		06
50	Stop Spring.....	50	50

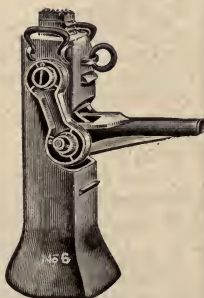
Discount.....

MOSHER LIFTING JACKS.

Fig. D. 270.
No. 0.Fig. D. 271.
Nos. 1, 2, 3,
4 and 5.

No.	Capacity, Tons.	Weight, Lbs.	Height, Inches.	Rise, Ins.	Price, Each.
0. For Car Inspector.....	8	19	11	6½	\$ 6 00
1. " Journals.....	12	25	11½	6	12 00
2. " Heavy Track.....	12	50	20	10	15 00
3. " Cars and Bridges.....	15	80	26	15½	22 50
4. "	15	72	20	12	20 00
5. " Cars and Locomotives....	20	96	26	15½	30 00

Discount.....

Fig. D. 272.
No. 6.Fig. D. 273.
No. 7.

No.	Capacity, Tons.	Weight, Lbs.	Height, Inches.	Rise, Ins.	Price, Each.
6. For Locomotives.....	30	120	24	13½	\$36 00
7. " Cars and Sleepers.....	20	118	34	23	38 00
8. " Track.....	10	34	20	10	10 00
9. Locomotive and Wrecking, with ground lift.....	35	125	26	15½	36 00

Discount.....



Fig. D. 274

JENNE TRACK JACKS.

Should Lifting Bar become oily, burn it off or scour it off with sand or coal ashes. If bar is frosty, heat with burning paper.

No.	Height, Inches.	Lift, Inches.	Weight, Lbs.	Price.
0.....	27	10	40	\$16 00
1 (5 Tons).....	31	12	60	20 00
2 (10 ").....	35	15	90	24 00

Discount.....

REPAIR PARTS FOR JENNE TRACK JACK.

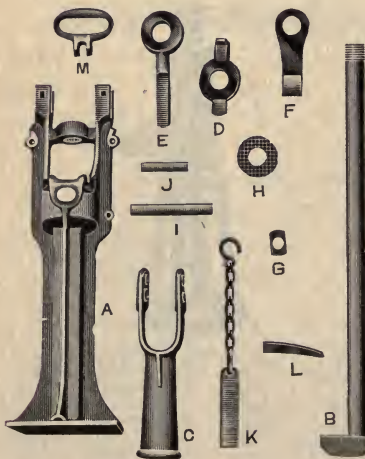


Fig. D. 275.

Description.	Size of Jack	
	No. 1.	No. 2
A Base or Stand.....	\$7 00	\$10 00
B Lifting Bar.....	1 50	2 00
*C Lever Socket.	2 00	2 50
D Upper Lifting Ring	1 00	1 25
E Lower Lifting Ring	1 00	1 25
*F Hanger.	75	1 00
G Bronze Boxes, per pair.....	90	1 00
H Lifting Bar Cap..	40	50
I Steel Fulcrum Pin.	40	50
*J Hanger Pin.....	30	40
K Trip Latch with Chain.....	40	50
L Split Keys, per pair	30	40
M Malleable Handle.	40	50
Wood Handle.....	1 00	1 00

Discount.....

No. 0 Repairs Same as No. 1.

*Always better when possible to order lever socket with hanger and steel pin complete, as exact fit is then assured.

Discount.....

BALL'S PATENT TELESCOPIC JACK SCREWS.



Fig. D. 276.



Fig. D. 277.

Style 1.

Style 2.

This Jack consists of two steel screws. One working within the other, operating simultaneously. By this method of construction the screws can be run out nearly double the height of the base, making a short Jack with great length of lift. Having two screws the Jack raises a load with double speed.

Fig. 1 represents the Jack with wrench.

Fig. 2 represents the Jack with ratchet lever.

Size.	Capacity.	Wt. Lbs.	Stand. Inches.	Height, Over All Inches.	Net Rise, Inches.	Whole Length, Inches.	Price, Style 1.	Price, Style 2.
No 1.	10 Tons.....	31	7½	10½	11	21	\$14 00	\$20 00
" 2.	25 "	59	11	14½	16	30	18 00	24 00
" 3.	25 "	68	13½	17½	23	40	22 00	28 00
" 4.	25 "	75	18	21½	31	52	28 00	34 00
" 5.	25 "	85	22½	26	36	61	30 00	56 00

Discount.....

CHAPMAN JACK.



Fig. D. 278

No.	Diam. Screw.	Height Over All.	Rise.	Price.
4	1	4	1½	\$ 1 50
6	1½	6½	2½	2 25
8	1¾	8	3½	3 00
10	1¾	10	4½	3 75
12	1¾	12	6	4 50
14	2½	14	7	6 00
16	2½	16	9	7 50
20	2½	20	12	10 50
24	2½	24	16	13 50
28	2½	28	20	16 50
30	2½	30	22	18 00
36	2½	36	28	24 00

Discount.....

RATCHET JACKS.

Barret Pattern.



Fig. D. 279.
No. 1.



Fig. D. 280.
No. 6.



Fig. D. 281.
No. 12.



Fig. D. 282.
No. 17.



Fig. D. 283.
No. 20.

Double Acting Trip Jacks.

No.	Height, Bar Down.	Height, Bar Raised.	Size of Bar, Inches.	Raise of Bar.	Weight, Pounds.	Capacity.	Price.
1	24 in.	37½ in.	1½x1½	13½ in.	62	10 Tons.	\$18 00
6	31 "	50 "	1½x1½	19 "	105	15 "	32 00
12	17½ "	25½ "	1½x1½	8 "	50	10 "	17 00

Single Acting Trip Jacks.

No.	Height, Bar Down.	Height, Bar Raised.	Size of Bar, Inches.	Raise of Bar.	Weight, Pounds.	Capacity.	Price.
17	24 in.	37½ in.	1½x1½	13½ in.	63	10 Tons.	\$18 00
20	31 "	50 "	1½x1½	19 "	106	15 "	32 00

Discount.....

RATCHET JACKS. Barrett Pattern.



Fig. D. 284.
No. 2.

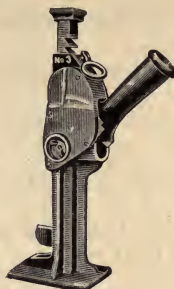


Fig. D. 285.
No. 3.



Fig. D. 286.
No. 4.

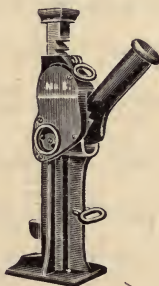


Fig. D. 287.
No. 5.



Fig. D. 288.
No. 8.

Double Acting Automatic Lowering Jacks—No Trip.

No.	Height, Bar Down.	Height, Bar Raised.	Size of Bar, Inches.	Raise of Bar.	Weight.	Capacity.	Price.
2	21 in.	31 in.	1½x1½	10 in.	65 lbs.	10 Tons.	\$ 25 00
3	26½ "	41½ "	1½x1½	15 "	85 "	12 "	30 00
4	22 "	32 "	2 x2	10 "	100 "	15 "	35 00
5	28 "	43 "	2 x2	15 "	115 "	15 "	40 00
8	11 "	16 "	1½x1½	5 "	48 "	10 "	22 00

Discount.....

RATCHET JACKS.



Fig. D. 289.
No. 18.



Fig. D. 290.
No. 19.



Fig. D. 291.
No. 50.

No.	Height, Bar Down.	Height, Bar Raised.	Size of Bar, Inches.	Raise of Bar.	Weight.	Capacity.	Price.
18	21 in.	31 in.	1 $\frac{1}{8}$ x1 $\frac{1}{2}$	10 in.	68 lbs.	10 Tons.	\$25 00
19	28 "	45 $\frac{1}{2}$ "	2 x2	17 $\frac{1}{2}$ "	102 "	15 "	35 00
50	16 "	24 "	1 $\frac{1}{2}$ x1 $\frac{1}{2}$	8 "	33 "	5 "	16 00

No. 18 and 19 Single Acting Automatic Lowering, No Trip Jack.
No. 50 Double Acting Automatic Lowering.

Discount.

PRICE LIST OF PARTS OF BARRETT PATTERN JACKS.

Symbol	Numbers.....	1	2	3	4	5	6	8	12	17	18	19	20
A	Base { with bushings. " and handle	\$7 50	\$10 00	\$12 50	\$13 50	\$16 00	\$16 00	\$9 00	\$ 6 75	\$ 7 50	\$10 00	\$15 00	\$15 00
*B	Socket lever, with side plate.	3 00	3 50	3 50	4 50	4 50	3 75	3 50	3 00	3 00	3 50	3 50	3 50
C	Shield.....	.....	90	90	1 00	1 00	.....	90	.....	.....	1 00	1 00	.....
D	Short pawl spring lever.	.....	30	30	30	30	30	30	30	30	30	30	30
E	Long " " " " " "	.....	30	30	30	30	30	30	30	30	30	30	30
F	Lowering block.	.....	80	80	90	90	.....	80	.....	.....	80	80	80
G	Eccentric.	.....	30	30	30	30	30	20	.....	.....	20	20	20
H	Right hand side plate.	30	30	30	30	30	30	30	30	30	30	30	30
I	Left " " " " " "	30	30	30	30	30	30	30	30	30	30	30	30
J	Top of rack.....	30	30	40	70	70	60	.....	30	30	30	30	30
K	Carrying handle.....	.....	20	20	20	20	30	20	.....	30	20	20	20
L	Long pawl.....	1 50	1 60	2 00	2 00	2 00	2 00	1 60	1 50	1 50	1 80	1 80	2 00
M	Short " " " " " "	1 50	1 60	1 70	1 80	1 80	2 00	1 60	1 50	1 50	1 60	1 65	2 00
N	Steel rack.....	4 50	5 00	8 50	9 00	10 00	9 00	2 00	4 00	4 50	5 00	9 25	9 00
O	Auxiliary lever.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	20	.....
O	Trip.....	50	.....	.....	.....	.....	45	.....	50	45	.....	.....	40
*P	Bushing (2) each.....	20	20	20	20	20	20	20	20	20	20	20	20
Q	Fulcrum pin.....	30	30	30	35	35	40	30	30	30	30	35	40
R	Side plate rivet (2) each	05	05	05	05	05	05	05	05	05	05	05	05
T	Spring (2) each.....	.....	10	10	10	10	.....	10	.....	.....	10	10	.....
U	Pawl pin.....	.....	.....	.....	.....	.....	.....	.....	.....	25	25	30	30
W	Wood handle.....	50	55	80	80	80	80	55	50	55	55	80	80
+MS	Short pawl screw.....	10	.....	.....	.....	.....	10	.....	10	10	10	10	10
SS	Shoulder " (4) each.....	.....	10	10	10	10	.....	.....	.....	.....	.....	08	.....
SCS	Short shield " (3) each.....	.....	08	08	08	08	.....	08	.....	.....	.....	10	.....
LCS	Long shield " " " " " "	.....	10	10	10	10	.....	10	.....	.....	10	10	.....
LS	Long pawl.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....
OS	Auxiliary lever screw.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	10	.....
GS	Eccentric screw.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	10	.....
FS	Lowering block screw.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	10	.....

*Bushings (P) are called "C" on the No. 1, No. 6 and No. 12 Jacks.

†Short Pawl Screws (MS) are called "S" on the No. 6 and No. 12 Jacks.

Discount.....

PULLING AND PUSHING JACK.

Pearson.

With Spud-Ends for Pushing.
Specially Adapted for Dock Work.

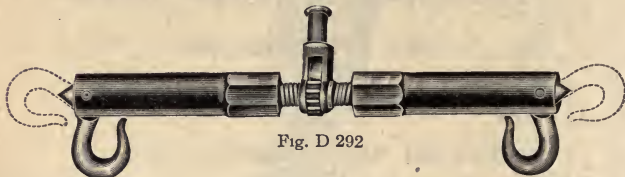


Fig. D 292

Capacity.....	7 tons.
Weight.....	50 lbs.
Length, closed with hooks dropped.....	33 inches.
Length, closed with hooks extended.....	39½ inches.
Run of screw.....	18 inches.
Price, each	\$20 00

Discount.....

RATCHET PULLING JACK.

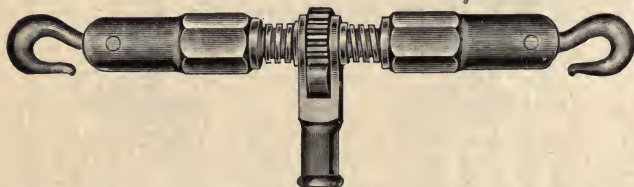


Fig. D. 293.

Where a short, powerful pull is desired to bring joints and connections together, this device is of great value.

Length closed 33 inches. Run of screw 12 inches.

Capacity 10 Tons.....	\$20 00
" 7 " 	16 00

Discount.....

RATCHET PULLING JACK.



Fig. D. 294.

With Locks and Links.

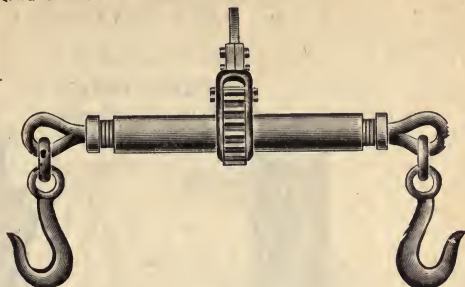
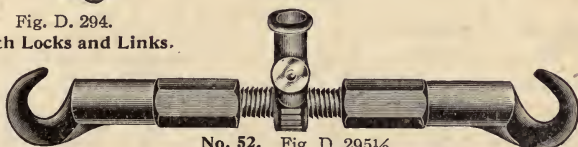


Fig. D. 295.

With Hooks.

SQUARE THREAD.		PRICE, EACH
		Either Style
18 inch barrel, 1	screw.....	\$ 8 50
24 inch barrel, 1	screw.....	9 50
30 inch barrel, 1	screw.....	10 00
36 inch barrel, 1	screw.....	11 00
18 inch barrel, 1	screw.....	16 00
24 inch barrel, 1	screw.....	17 00
26 inch barrel, 1	screw.....	17 50
28 inch barrel, 1	screw.....	18 00
30 inch barrel, 1	screw.....	19 00
36 inch barrel, 1	screw.....	20 00
48 inch barrel, 1	screw.....	24 00

Discount.....



No. 52. Fig D. 295½.

A Jack especially suited for heavy pulling. Much stronger, more reliable, and considerably cheaper than differential chain hoists. The bracket type thread is used, thus giving great strength. For lifting in warehouses, pulling piling, pipes, etc., these Jacks are unexcelled.

Dimensions and Price

Length Inside Hook when Closed, Inches.....	24
Run of Screw, Inches.....	12
Diameter of Screw, Inches.....	1½
Capacity, Tons.....	8
Weight, Pounds.....	25
Price.....	\$15 00

Discount.....

STONE JACKS.



Fig. D. 296.

Wood Frame.



Fig. D. 297.

Steel Jack.

Capacity, Tons.	Height, Inches.	Wood Frame.		Steel Jack.		
		Weight, Pounds.	Price.	Height, Inches.	Weight Lbs.	Price.
2	34	95	\$ 45 00	32	75	\$ 45 00
3	34½	110	50 00	32½	85	50 00
4	35	120	55 00	34	100	55 00
5	36	135	62 00	34	115	62 00
6	36½	150	70 00	35	135	70 00
8	37	185	85 00	36	160	85 00
10	37½	200	110 00	36	170	110 00
12	38	230	120 00	37	200	120 00
15	39	275	140 00	39	225	140 00
18	39	300	150 00	.....	.....	.....
20	39	315	162 50	.....	.....	.....
25	39	350	175 00	.....	.....	.....
30	39	400	200 00	.....	.....	.....

Discount.....

INSPECTION CAR.

The Railway Cycle.

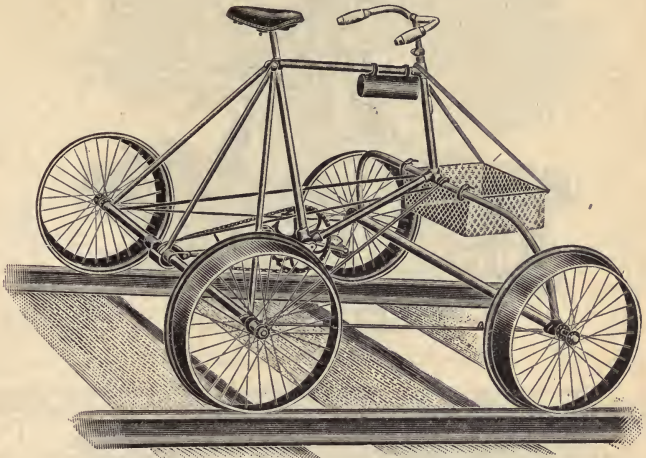


Fig. D 298.

The wheels are faced with $\frac{3}{16}$ " rubber, held in position by patent rim, which renders the wheel absolutely noiseless, thereby enabling the rider to hear an approaching train; and also permits riding the car when the rails are frosty. There is little or no wear to this facing, but it may be replaced at a moderate cost.

Car has ball bearings throughout.

Single seated car weighs 65 pounds; double seated car, 75 pounds.

Fitted with tools, tool bag and loose luggage basket.

Price, Single Seated Car.....	\$ 75 00
" Double " " 	100 00

Discount.....

HAND CARS.

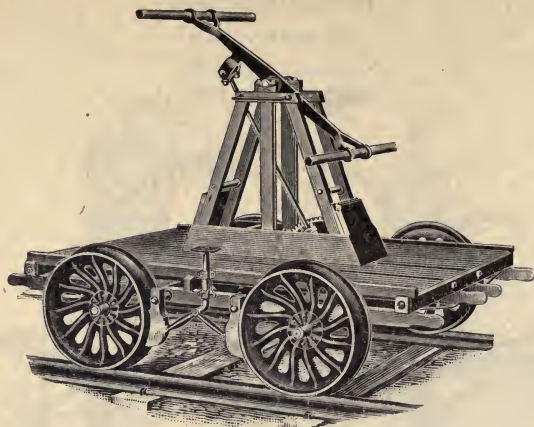


Fig. D. 299.

Wheels made from a single plate of steel, are formed into required shape by drawing and spinning, and consequently metal is not subjected to unnatural strains.

No. 1. Standard Hand Car.

Standard gauge; platform, 6 feet long by 4 feet 4 inches wide; wheels, 20 inches in diameter; axles, 1½ inches in diameter; weight, 510 pounds.

Price.....\$40 00

No. 3. Bridge Gang Hand Car.

Standard gauge; platform, 8 feet long by 5 feet 8 inches wide; axles 1½ inches diameter; weight, 735 pounds; capacity 12 to 15 men and tools.

Price.....\$50 00

No. 6. Narrow Gauge Hand Car.

Platform, 6 feet 4 inches long by 4 feet 1 inch wide; wheels, 20 inches in diameter; outside bearing; weight, 570 pounds.

Price.....\$40 00

No. 9. Light Inspection Car, with two Revolving Chairs in Front.

For use of Roadmaster and Supervisors of Track. Car has same size platform, as No. 1, but lighter construction throughout. Furnished with single or double end lever, as desired. Weight, 430 pounds. Lightest Car built.

Price.....\$48 00

No. 10. Inspection Car, with two Revolving Chairs in Front.

Double brake can be applied by Inspectors or Operator. Will carry three Inspectors and four Operators. Weight, 580 pounds.

Price.....\$50 00

Discount.....

PUSH CARS.

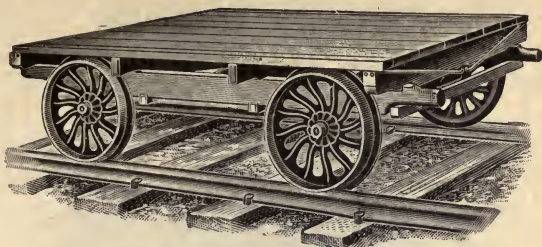


Fig. D. 300.

No. 16. Push Car, with Steel Wheels.

Standard gauge; platform 7 feet long by 5 feet 8 inches wide, wheels 20 inches diameter; axles $1\frac{1}{2}$ inches diameter; weight, 475 pounds.

Price\$28 00

No. 16½. Heavier Framing, with 2-inch Axles; Weight 700 Pounds.

Price\$35 00

No. 17½. Push Car.

General dimensions same as No. 6 but without decking. Sills covered with heavy plate iron; weight, 560 pounds.

Price\$27 00

TRACK LAYING OR IRON CARS.

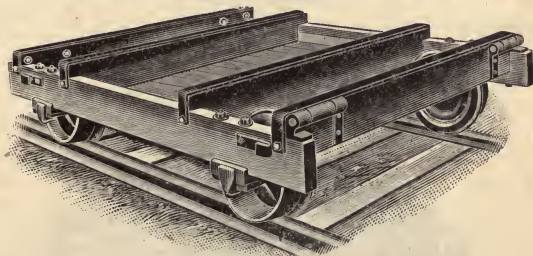


Fig. D. 301.

No. 8.

The frame is made of thoroughly seasoned oak, length of sills $7\frac{7}{8}$ ", width over sills $5\frac{1}{10}$ ". The sills are heavily ironed with $2\frac{1}{2}$ "x $\frac{3}{4}$ " bars, the bars extend over and are fastened to longitudinal sills with bolts, running through and into cross sills, height above top of rail $1\frac{1}{8}$ ", cast chilled wheels 16" in diameter, tread of wheel $3\frac{1}{2}$ ", axles $2\frac{1}{2}$ " diameter, one loose wheel on each axle, set diagonally from each other, wheel base $4\frac{1}{5}$ ". There are two rollers at each end to facilitate the handling of rails. Weight of car 1,325 pounds.

Price\$70 00

No. 8½ Extra Heavy. Constructed similar to No. 8, except that the sills are $6\frac{6}{8}$ " wide, and tread of wheel is 6". Weight 1,600 pounds.

Price\$85 00

Discount.....

VELOCIPED HAND CARS.

No. 1 Car for One Person.

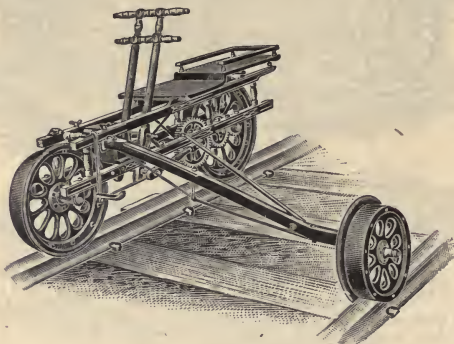


Fig. D. 302.

Weight 150 lbs.

Price with either wood or steel wheels.....\$35 00

No. 2 Car for Two Persons.

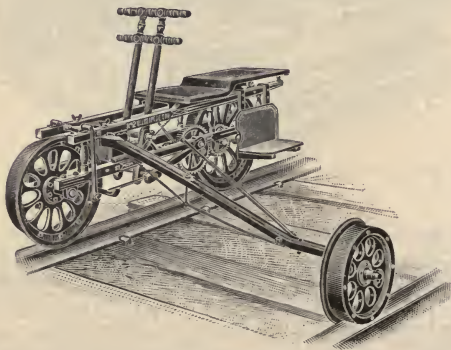


Fig. D. 303.

Weight 150 lbs.

Price with either wood or steel wheels.....\$36 50

VELOCIPED HAND CARS.

No. 3 Telegraph Car.

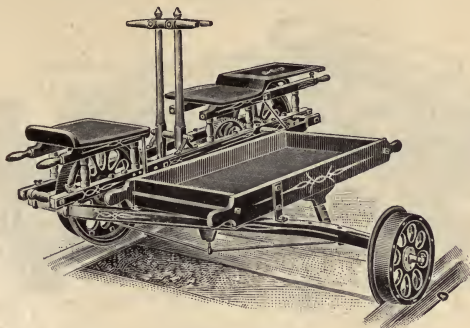


Fig. D. 304.

Weight 185 lbs.; seats for three people.

Price, with either wood or steel wheels.....\$45 00

No. 4 Inspection Car.

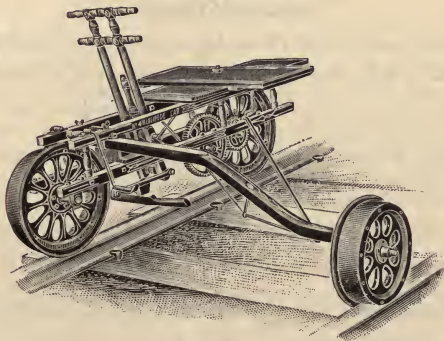


Fig. D. 305.

Weight 165 lbs.

Price, with either wood or steel wheels.....\$36 50

Is so arranged that if only one person wishes to use same, the seat can be swung around and will then take up no more space than the regular one-man car

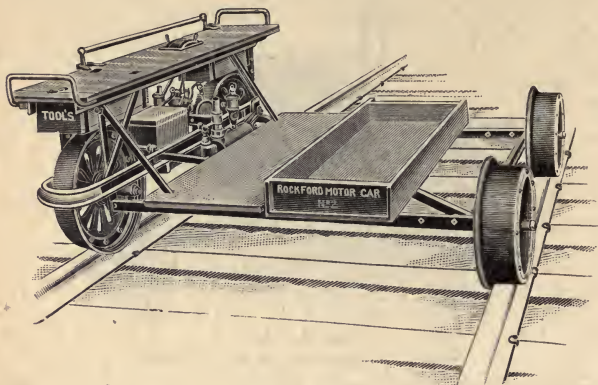
RAILWAY INSPECTION CAR.**Rockford No. 2.****Gasoline Motor.**

Fig. D. 306.

SPECIFICATIONS.

FRAME. Constructed entirely of welded steel channels and angle iron.

POWER. Two cylinder, four cycle engine, direct connected to driving axle, developing $3\frac{1}{2}$ H. P., cylinders $3\frac{1}{2} \times 5\frac{1}{2}$ inches, air cooled.

CONTROL. Spark and throttle.

CARBURETOR. Automatic gravity feed type—requires no adjustments.

IGNITION. Six cell battery, with water proof vibrating spark coil, two point commutator with special motor car jump spark.

GASOLINE. Two gallon tank under car seat; sufficient to run eighty miles.

BRAKES. Severe type on driving wheels.

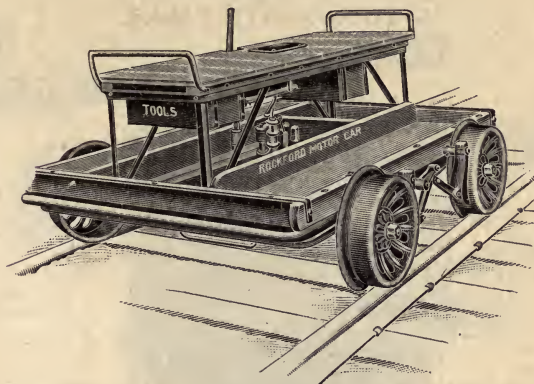
WHEELS. 16" driving wheels, 14" guide wheels, pressed steel, wood centers, M. C. B. flanges.

CAPACITY. One to four persons.

SPEED. From two to thirty miles.

WEIGHT. 375 pounds.

Prices on application.

RAILWAY SECTION CAR.**Rockford No. 4.****Gasoline Motor.****Fig. D. 307.****SPECIFICATIONS.**

FRAME. Entirely constructed of welded steel channels and angle iron.

POWER. Two cylinder, four cycle engine, direct connected; developing $7\frac{1}{2}$ actual H. P.

CONTROL. Spark and throttle.

CARBURETOR. Automatic gravity feed type; no adjustment required.

IGNITION. Jump spark from two four-cell dry batteries in connection with a water proof spark coil and special two point contract commutator.

AXLES. $1\frac{1}{8}$ inch steel.

WHEELS. 16 inch pressed steel, M. C. B. flange.

BRAKES. Severe type on all four wheels.

CAPACITY. Ten men and tools.

GASOLINE. Three and one half gallons under seat, sufficient to run car 100 miles.

PLATFORM. 5 ft., $9\frac{1}{2}$ in. by 4 ft., $4\frac{1}{2}$ in.

SPEED. From 3 to 35 miles per hour.

WEIGHT. 700 pounds.

Price on application.

STATION WATER TANKS.



Fig. D. 308.

Prices and Specifications on application.

HALLADAY IMPROVED VALVE, OUTLET PIPE, SPOUT AND FIXTURES.

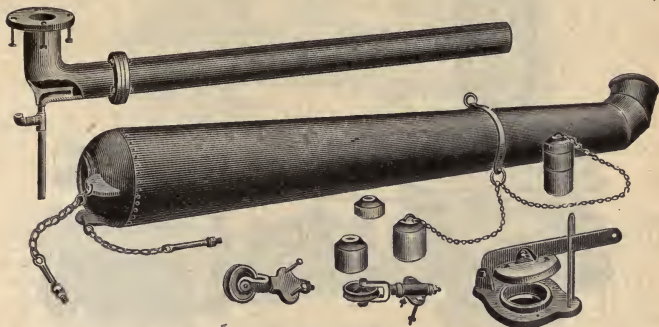


Fig. D. 309.

Strictly frost proof. When ordering, always state the diameter of Tank and distance to center of track.

Price List of Improved Outlet Pipe, Spout and Fixtures (including Valve).

6 inch for 16 feet diam. Tank..	\$70 00	8 inch for 16 feet diameter Tank	\$90 00
6 " " 20 " " "	75 00	8 " " 20 " " "	95 00
6 " " 24 " " "	80 00	8 " " 24 " " "	100 00
7 " " 16 " " "	80 00	10 " " 16 " " "	122 00
7 " " 20 " " "	85 00	10 " " 20 " " "	128 00
7 " " 24 " " "	90 00	10 " " 24 " " "	134 00
		12 " " 24 " " "	182 00

Discount.....

Price Valves Only.

These Valves are warranted not to leak and to last as long as the Tank itself, without any repairs whatever.

Price, 6-inch Outlet Valve.....	\$12 00
" 7 " " "	15 00
" 8 " " "	18 00
" 10 " " "	30 00
" 12 " " "	40 00
" 14 " " "	55 00

Discount.....

SINGLE BOILER-FEED PUMPS.

Piston Pattern.

For Hot or Cold Water or other Liquids.

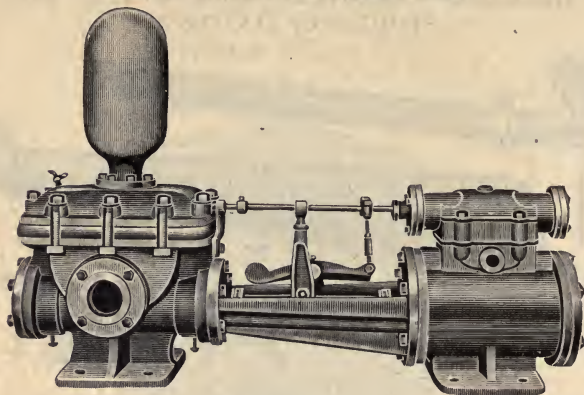


Fig. D. 310.

All parts of these pumps are interchangeable, and can therefore be readily duplicated in case of accidental breakage or unusual wear.

The pumps have large direct water passages and full valve areas, which not only reduce water friction to a minimum, but enable them to be run at a speed that makes them efficient fire pumps.

Steam Cyl., Inches.	Water Cyl., Inches.	Stroke, Inches.	Gallons per Stroke.	Capacity per Minute at Maxim. Speed, Gallons.	Steam Pipe, Inches.	Exhaust Pipe, Inches.	Suction Pipe, Inches.	Delivery Pipe, Inches.	Price.		Shipping Weight, Pounds.
									Steel, Fitted.	Brass, Fitted.	
2 1/2	1 1/2	3	.023	3 1/2	1 1/2	1 1/2	1 1/2	1 1/2	\$ 51 70	\$ 53 34	45
3 1/2	2 1/2	3	.031	4 1/2	1 1/2	1 1/2	1 1/2	1 1/2	57 20	59 08	50
3 3/4	2 3/4	4	.05	7 1/2	1 1/2	1 1/2	1 1/2	1 1/2	79 20	82 50	140
3 7/8	2 7/8	4	.07	10 1/2	1 1/2	1 1/2	1 1/2	1 1/2	85 80	89 10	160
4	3	5	.11	16 1/2	1 1/2	1 1/2	1 1/2	1 1/2	99 00	102 30	175
5	4	7	.25	31	1 1/2	1 1/2	1 1/2	1 1/2	144 10	150 70	400
5 1/2	4 1/2	7	.33	41	1 1/2	1 1/2	1 1/2	1 1/2	150 70	157 30	400
7	6	7	.38	47	1 1/2	1 1/2	1 1/2	1 1/2	198 00	205 70	480
7 1/2	6 1/2	10	.85	85	1 1/2	1 1/2	1 1/2	1 1/2	261 80	272 80	875
8	7	12	1.02	102	1 1/2	1 1/2	1 1/2	1 1/2	316 80	335 50	950
10	8	12	1.47	147	1 1/2	1 1/2	1 1/2	1 1/2	404 80	424 60	1,500
12	10	12	2.00	200	2	2	2	2	462 00	481 80	1,600
14	12	12	2.61	261	2	2	2	2	519 20	545 60	1,750

Larger sizes to order at short notice.

Discount.....

DUPLEX BOILER-FEED PUMPS.

Piston Pattern.

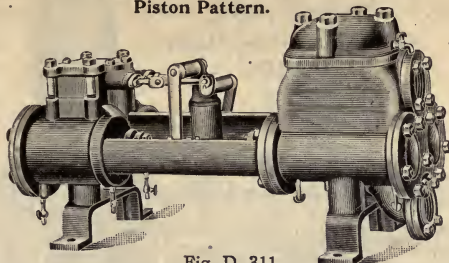


Fig. D. 311

For 150 Pounds Maximum Pressure.

These pumps are provided with double-acting water pistons, and are suitable for boiler feeding, fire service, or for general purposes. The water cylinders are brass lined, and the water pistons are arranged so that the packing may be readily renewed when required.

Steam Cyl. Diam., Inches.	Water Cyl. Diam., Inches.	Stroke, Inches.	Capacity in Gals. per Stroke, Each Piston.	Strokes per Minute, Each Piston.	Capacity of Both Cyls. in Gals. per Minute.	Steam Pipe, Inches.	Exhaust Pipe, Inches.	Suction Pipe, Inches.	Discharge Pipe, Inches.	Prices		Shipping Weight Pounds
										Regular Fitted.	Brass Fitted.	
2	1½	2½	.014	100	2			1	½	\$ 49 50	\$ 49 50	90
3	2	3	.04	100	8			1½	1	60 50	62 70	150
4	2½	4	.10	100	20			2	2	99 00	103 40	320
5	3	5	.20	100	40		1	2½	2½	132 00	139 16	435
6	4	6	.33	100	66	1	1½	3	3	154 00	166 10	565
7	5	6	.51	100	100	1½	1½	4	3	214 50	226 60	850
7½	4½	10	.69	75	100	1½	1½	4	3	286 00	319 00	970
8	5	10	.93	75	135	1½	2	4	3	330 00	363 00	1085
9	5½	10	.93	75	135	1½	2	4	3	330 00	363 00	1150
8	6	10	1.22	75	180	1½	2	5	4	412 50	445 50	1275
10	6	10	1.22	75	180	1½	2	5	4	412 50	445 50	1500
10	6	12	1.47	65	191	1½	2	5	4	561 00	598 40	1700
10	7	12	1.66	75	245	1½	2	6	5	566 50	599 50	2500
10	7	12	2.00	65	260	1½	2	6	5	594 00	631 40	2700
12	7	10	1.66	75	245	2½	3	6	5	676 50	742 50	3600
12	7	12	2.00	65	260	2½	3	6	5	704 00	778 80	3800
14	7	10	1.66	75	245	2½	3	6	5	704 00	770 00	3850
14	7	12	2.00	65	260	2½	3	6	5	737 00	811 80	4000
12	8½	10	2.45	75	365	2½	3	6	5	770 00	836 00	4100
12	8½	12	2.95	65	383	2½	3	6	5	797 50	872 30	4300
14	8½	12	2.45	75	365	2½	3	6	5	797 50	863 50	4300
14	8½	12	2.95	65	383	2½	3	6	5	825 00	899 80	4500
16	8½	10	2.45	75	365	2½	3	6	5	962 50	1030 70	5000
16	8½	12	2.95	65	383	2½	3	6	5	990 00	1060 40	5200

Prices on other sizes can be furnished on application.

Discount.....

SINGLE TANK OR LIGHT-SERVICE PUMPS.



Fig. D. 312.

For pumping water or other liquids to limited heights, these pumps combine large pumping capacity with small expenditure of steam, the steam cylinders, in proportion to the pump cylinders, being smaller in diameter than with the regular pressure pumps. They can be fitted for pumping hot, cold, thick, thin, alkaline or other liquids, as required.

All sizes up to 8 x 8 x 12, inclusive, are good for water pressures of 50 pounds. Larger sizes suited for 35 pounds maximum.

Steam Cyl., Inches.	Water Cyl., Inches.	Stroke, Inches.	Gallons per Stroke	Capacity per Minute at Maximum Speed, Gals.	Steam Pipe, Inches.	Exhaust Pipe, Inches.	Suction Pipe, Inches.	Delivery Pipe, Inches.	Prices.		Shipping Weight, Pounds
									Regular Fitted.	Brass Fitted	
3½	3½	4	.14	17	1½	1½	2	1½	\$110 00	\$113 30	250
4	4	5	.27	33	1½	1½	2	1½	126 50	129 80	300
5	5	7	.38	47	1	1	2½	2	79 75	166 10	400
5½	5½	7	.72	90	1	1	3	2½	187 00	193 60	500
6	5½	7	.72	90	1	1	3	2½	192 50	199 10	500
6	6	12	1.47	147	1	1	4	4	357 50	376 20	980
6	7	12	2.00	200	1	1	5	5	374 00	392 70	1,000
7½	7½	10	1.66	166	1	1½	5	5	324 50	335 50	900
7	7½	10	1.91	191	1	1½	5	5	324 50	335 50	900
8	6	12	1.47	147	1	1½	4	4	390 50	409 20	1,000
8	7	12	2.00	200	1	1½	5	5	396 00	414 70	1,025
8	8	12	2.61	261	1	1½	5	5	412 50	431 20	1,075
8	9	12	3.30	330	1	1½	6	6	462 00	480 70	1,680
8	10	12	4.08	408	1	1½	6	6	473 00	491 70	1,680
10	7	12	2.00	200	1½	1½	5	5	434 50	454 30	1,350
10	8	12	2.61	261	1½	1½	5	5	451 00	470 80	1,425
10	10	12	4.08	408	1½	1½	6	6	511 50	531 30	1,850
10	12	12	5.87	587	1½	1½	8	6	682 00	701 80	2,650
12	12	12	5.87	587	2	2½	8	6	709 50	729 30	2,725
14	10	12	4.08	408	2	2½	6	6	588 50	614 90	2,300

Prices on larger sizes can be furnished on application.

Discount.....

DUPLEX TANK OR LIGHT SERVICE PUMPS.

Piston Pattern.

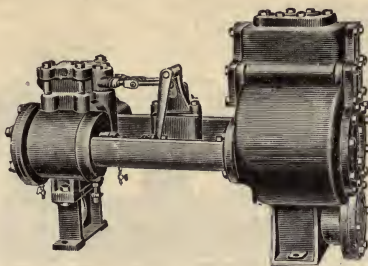


Fig. D. 313.

These pumps are designed for use where the liquid handled is to be raised to a moderate height only, the steam cylinders being smaller in proportion to the water cylinders than in pumps of the pressure pattern. They are adapted for a great variety of service and can be fitted for pumping hot, cold, thick, thin or other kinds of liquids as required.

Steam Cyl. Diam., Inches.	Water Cyl. Diam., Inches.	Stroke, Inches.	Capacity per Stroke, Each Piston, Gals.	Capacity per Minute, Both Cyls., Gals.	Steam Pipe, Inches.	Exhaust Pipe, Inches.	Suction Pipe, Inches.	Discharge Pipe, Inches.	Prices		Shipping Weight Pounds.
									Regular Fitted.	Brass Fitted.	
3	2	3	.08	15			1	1	\$ 71 50	\$ 73 70	125
4	3	4	.19	38			2	1	115 50	119 90	300
5	4	5	.38	76			3	2	154 00	161 15	500
6	5	6	.67	134	1	1	4	3	192 50	204 60	660
7	6	10	1.22	183	1 1/2	1 1/2	5	4	330 00	363 00	1,200
6	7	6	1.14	228	1	1 1/2	6	5	280 50	292 60	950
7	7	6	1.14	228	1 1/2	1 1/2	6	5	297 00	309 10	1,150
6	8	6	1.47	294	1	1 1/2	6	5	297 00	309 10	950
7	8	6	1.47	294	1 1/2	1 1/2	6	5	313 50	325 60	1,150
7	7	10	1.66	249	1 1/2	1 1/2	6	5	412 50	445 50	1,500
7	8	10	2.45	367	1 1/2	1 1/2	6	5	467 50	500 50	1,800
10	8	10	2.45	367	2	2	6	5	550 00	583 00	2,000
10	10	10	3.57	535	1 1/2	2	8	7	753 50	786 50	2,800
12	10	10	3.75	562	2	3	8	7	913 00	957 00	3,700
10	12	10	4.89	733	1 1/2	2	10	8	924 00	957 00	3,800
12	12	10	4.89	733	2 1/2	3	10	8	1023 00	1067 00	4,500

Prices on other sizes furnished on application.

Discount.....

CENTRIFUGAL PUMPS.

Morris Improved Standard Iron.

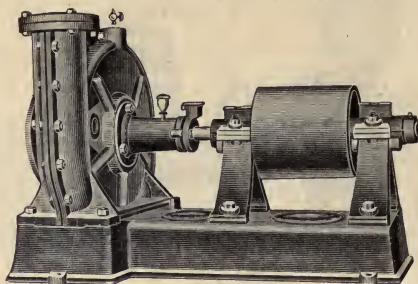


Fig. D. 314.
Horizontal Shaft.

This type used extensively for all purposes, and for general work, is one of the best pumps on the market. Has large diameter shaft running in long bearings lined with best babbitt metal. Hub bearing is long. All parts are accurately machine fitted.

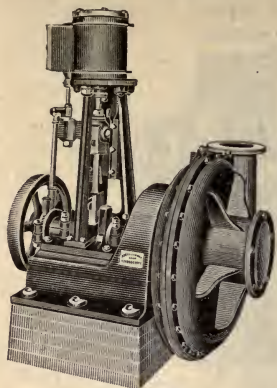
Furnished complete with all oilers and wrenches, and with suction and discharge flanges, threaded for standard wrought iron pipe.

Size	Size of Openings, Suction and Discharge. Inches.	Rated Capacity in Gallons per Minute.	Size of Pulley. Inches.	Horse-Power per Foot of Lift.	Approximate Weight With- out Primer.	List Price. Iron Pump Without Primer.	List Price. Iron Pump With Primer.	Extra for Brass Fitted Pump.
4	5	470	10x10	.30	615	\$130 00	\$160 00	\$ 40 00
6	8	1050	15x12	.59	1180	200 00	245 00	90 00
8	10	2000	20x12	1.00	2065	310 00	375 00	130 00
10	12	3000	24x12	1.52	2610	395 00	470 00	165 00
12	15	4200	30x14	2.00	3615	500 00	.....	275 00
15	18	7000	40x15	3.50	8250	850 00	.....	.....
18	20	10000	40x16	4.50	9000	1300 00	.....	.....
20	22	12000	36x20	5.40	7000	1600 00	.....	.....
24	24	15000	.....	6.50	.....	.....	.....	.....
30	30	22000	.....	9.00	.....	.....	.....	.....
36	36	32000	.....	13.00	.....	.....	.....	.....

Prices and specifications for pumps above twenty inches furnished on application.

Prices and full particulars on other styles of Morris Centrifugal Pumps furnished on application.

Discount.....



MORRIS CENTRIFUGAL STEAM PUMP.

Pumps directly connected to engines are to be preferred to belt-driven pumps when conditions will allow, as they take up little space and are more economical.

These pumps are used for irrigation, reclamation, pumping sewage, wrecking, coffer-dam work, etc.

The engines are furnished complete with throttle valve, lubricator and all oilers, including large oil tank with tubes to all running parts for automatic lubrication. The engines are of the open-frame type, very strong and give easy access to the working parts.

We shall be pleased to submit proposition and drawings for any special service.

Fig. D. 315.

Side Suction Pump Directly Connected.

No. Pump (Diameter Discharge Opening).	Economical Capacity Gallons per Minute.	Suitable for Elevations in Feet up to.	Size Steam Cylinder.		Size Steam Pipe, Inches.	Size Exhaust Pipe, Inches.	Weight, Lbs., Side Suction.	Weight, Lbs., Double Suction.
			Diam- eter.	Stroke.				
2	120	25	3	3	1	1	500	560
2½	180	25	3	3	1	1	510	585
3	260	25	3	3	1	1	545	550
4	470	25	4	4	1	1	925	1,070
4	470	25	5	5	1	1½	1,150	1,275
5	735	25	5	5	1	1½	1,175	1,325
6	1,050	30	5	5	1	1½	1,325	1,525
6	1,050	30	6	6	1	1½	1,480	1,675
7	1,400	25	5	5	1	1½	1,400	1,600
8	2,000	20	6	6	1	1½	2,150	2,360
8	2,000	25	7	7	2	2	2,450	2,660
8	2,000	30	8	8	1	2½	2,650	2,875
10	3,000	10	6	6	1	1½	2,800	3,440
10	3,000	15	7	7	1	2	3,000	3,640
10	3,000	20	8	8	1	2½	3,100	3,760
10	3,000	25	9	9	2	3	4,475	5,100
10	3,000	30	10	10	2	3	4,650	5,290
†10	3,000	40	12	10	2	3	7,200	8,700
12	4,200	20	9	9	2	3	4,600	5,500
12	4,200	25	10	10	2	3	5,750	6,650
12	4,200	30	12	10	2	3	6,300	7,200
†12	4,200	40	14	12	3	3½	9,000	10,000
15	7,000	30	14	14	3	4	13,100	14,600
*15	7,000	22	12	10	2½	3	6,700	7,500

*Low lift pumps. *Special high lift pumps. Quotations on larger sizes or on special combinations on application. We can furnish any steam pump with compound engines directly connected. Prices on application.

CENTRIFUGAL PUMPS.

Holmes Hydraulically Balanced.

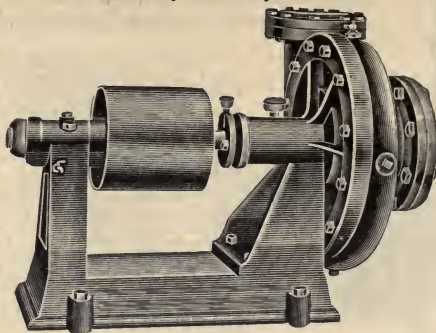


Fig. D. 316.

Horizontal Shaft.

Capable of handling large quantities of water and with a considerable percentage of solid matter.

They are designed to secure the best economy at the capacities given and should be used with pipe lines at least as large as the size of the suction and discharge openings. Considerable power will be saved in long lines by using larger pipes.

Single stage, belt driven, low pressure. Designed for and gives highest economy on heads of 65 feet or less.

Pump Number and Diameter. Discharge in Inches.	Diameter Suction in Inches.	Economical Capacity in Gallons per Minute.	Horse Power per Foot Lift.	Pulleys.		Approximate Shipping Weight, Iron.	Price, Iron	Price, Brass-Fitted.
				Diameter.	Face.			
1	1½	25	.011	3½	2½	50	\$ 30 00	\$ 36 00
1½	2	75	.032	4	4	135	45 00	60 00
2	2½	125	.045	4	4	155	75 00	90 00
2½	3	185	.072	6	6	225	90 00	110 00
3	4	265	.118	7	6	250	110 00	135 00
3½	5	370	.137	7	8	375	120 00	160 00
4	6	480	.175	8	8	410	130 00	180 00
5	7	750	.256	9	10	715	165 00	215 00
6	8	1100	.39	10	10	775	200 00	250 00
7	9	1500	.53	12	12	1015	260 00	.....
8	10	2200	.75	14	12	1325	310 00	.....
10	12	3300	1.13	16	16	2100	395 00	.....
12	15	4500	1.52	20	16	2510	500 00	.....
15	15	7300	2.41	24	16	3200	850 00	.....
18	18	10500	3.44	20	20	5500	1300 00	.....
20	20	14000	4.47	24	20	7500	1600 00	.....
24	24	20000	6.28	30	24	12000	2150 00	.....

Grease Cups, Suction and Discharge Flanges, threaded for standard pipe included with above list prices.

Discount.....

CENTRIFUGAL PUMPS. "Holmes."

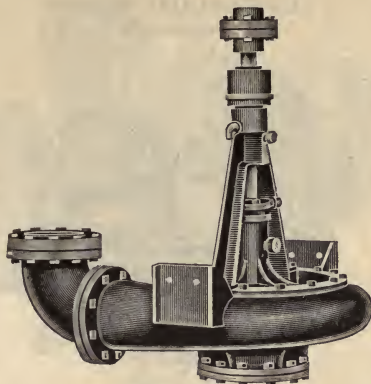


Fig. D. 317.
Vertical Shaft.

Single stage, belt driven, low pressure.

Designed for and gives highest economy on heads of 65 feet or less.

Pump No. and Diameter Discharge in Inches.	Diameter Suction in Inches.	Economical Capacity in Gallons per Minute.	Horse Power per Foot Lift	Pulleys.		Approximate Shipping Weight, Iron.	Price. Iron.	Price. Brass Fitted
				Diameter.	Face.			
1½	2	75	.032	4	4	135	\$ 45 00	\$ 60 00
2½	2½	125	.045	4	4	150	75 00	90 00
2½	3	185	.072	6	6	250	90 00	110 00
3½	4	265	.118	7	6	285	110 00	135 00
3½	5	370	.137	7	8	390	120 00	160 00
4	6	480	.175	8	8	435	130 00	180 00
5	7	750	.256	9	10	585	165 00	215 00
6	8	1100	.39	10	10	660	200 00	250 00
7	9	1500	.53	12	12	1090	260 00	.....
8	10	2200	.75	14	12	1200	310 00	.....
10	12	3300	1.13	16	16	2250	395 00	.....
12	15	4500	1.52	20	16	2675	500 00	.....
15	15	7300	2.41	24	16	3200	850 00	.....
18	18	10500	3.44	20	20	3750	1300 00	.....
20	20	14000	4.47	24	20	5800	1600 00	.....
24	24	20000	6.28	30	24	9350	2150 00	.....

Above list prices are for pump, as shown above, pump discharge elbow, grease cups, pulley, one clutch shaft coupling, flanges on suction and discharge threaded for standard pipe, and a self-lubricating thrust bearing to sustain weight of shafting pulley and pump impeller. Prices on high pressure on application.

Discount.....

CENTRIFUGAL PUMPS.

"Worthington."

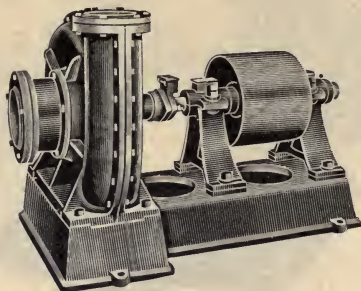


Fig. D. 318.
Horizontal Shaft.

These pumps are designed for any head up to and including 60 feet maximum. The horse power and speed given in table are for maximum capacity at maximum head for belt driven pumps only. Direct connected engine driven pumps are suitable for from 15 to 30 foot head, depending on speed obtainable. These pumps are especially suitable for contracting work, such as pumping out cofferdams and excavations; also for small irrigation plants where low first cost is of more importance than economy in operation.

BELTED PUMPS

Pump Dis., in inches.	Gals. per Min.	Cu. Ft. per Sec.	Shipping Weight.	List Price Without Primer.	Revolution per Minute.	Horse Power.
1½	70	.15	210	\$ 59 40	1110	4
2	125	.25	380	69 40	760	6.5
2½	200	.45	420	79 20	780	8
3	300	.60	450	97 00	810	12
4	475	1.05	720	113 85	800	20
5	750	1.65	1060	145 50	730	32
6	1000	2.23	1370	167 30	550	33
8	2000	4.46	2230	259 40	520	63
10	3000	6.69	2800	330 65	505	79
12	4000	8.92	4100	417 80	375	108

Discount.....

GENERAL SERVICE SINGLE-ACTING TRIPLEX PUMPS.

Deming.

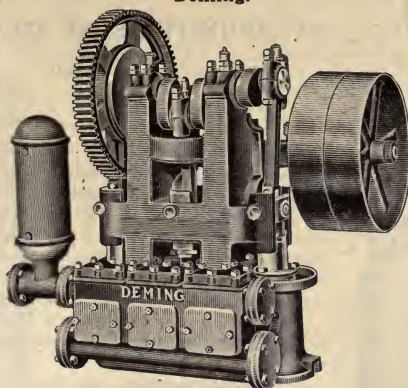


Fig. D. 319.

No. 50.—Size $5\frac{1}{2} \times 3$ and 6×8 .

Designed for water works, hydraulic elevator service, pulp grinders and for general water supply. Specifications furnished upon request.

Standard Sizes, Capacities, Etc.

Plungers.		Capacity.			Maximum Working Pressure, Pounds.	Diam. of Pipes.		Gear Ratio.	*Tight and Loose Pulleys.
Diam., Inches.	Stroke, Inches.	Gallons per Rev.	Usual Revs. per Min.	Gallons, per Min.		Suction, Inches.	Dischg., Inches.		
2	2	.081	70	5.67	150	1 $\frac{1}{2}$	1	5 to 1	8x 2
2 $\frac{1}{2}$	2	.127	70	8.89	150	1 $\frac{1}{2}$	1	5 to 1	10x 2
2 $\frac{1}{2}$	3	.19	60	11.4	150	2	1 $\frac{1}{2}$	5 to 1	12x 3
3	3	.27	60	16.2	150	2	1 $\frac{1}{2}$	5 to 1	14x 3
3 $\frac{1}{2}$	3	.37	60	22.	150	2	1 $\frac{1}{2}$	5 to 1	16x 3
3 $\frac{1}{2}$	4	.50	60	30.	150	2 $\frac{1}{2}$	2	5 to 1	16x 4
4	4	.65	60	39.	150	2 $\frac{1}{2}$	2	5 to 1	18x 4
4	6	.98	60	59.	160	2 $\frac{1}{2}$	2	5 to 1	20x 5
4 $\frac{1}{2}$	6	1.24	60	74.	150	3	2 $\frac{1}{2}$	5 to 1	20x 5
5	6	1.53	60	91.	150	3	2 $\frac{1}{2}$	5 to 1	24x 5
5 $\frac{1}{2}$	8	2.46	60	147.	150	4	3	5 to 1	28x 6
6	8	2.94	55	161.	140	4	3	5 to 1	30x 6
7	8	4.00	55	220.	150	5	4	5 to 1	30x 8
8	8	5.22	55	287.	150	5	4	5 to 1	36x 8
8 $\frac{1}{2}$	8	5.90	55	324.	140	6	5	5 to 1	36x 8
9	10	8.26	50	413.	160	8	6	5 to 1	42x10
10	10	10.20	45	459.	150	8	6	5 to 1	42x12
11	12	14.81	42	622.	160	10	8	5 to 1	48x14
12	12	17.62	42	740.	150	10	8	5 to 1	48x16
12	14	20.50	40	820.	150	12	10	5 to 1	48x18
13	14	24.10	40	964.	140	12	10	5 to 1	48x20

*Note.—Sizes 9x10 and larger regularly furnished with tight pulley only.
Prices on application.

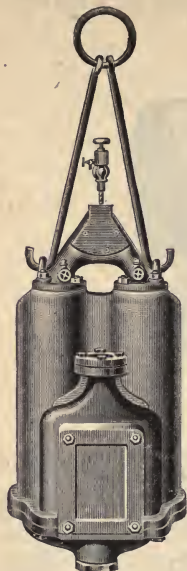


Fig. D. 320.

NYE HIGH PRESSURE STEAM PUMP.

New Model.

This pump is especially designed and adapted for wells or caissons in deep foundation and mining work. Our No. 2 Pump requires only a space of 20 inches square for installation. Does not interfere with the placing of lagging, as pump is suspended and a 10 foot suction hose is attached to the bottom of pump, allowing ample room for all other necessary operations below point where pump is placed—a very important feature.

Guaranteed to deliver water a height of 150 feet, and will, without injury, handle water containing sand or silt.

This pump creates a very high vacuum and will therefore lift water by suction to great heights and with great rapidity.

Adapted for mining, railroads, paper mills, chemical or gas works, tanneries, brewery or sugar refineries; draining quarries; irrigating or hydraulic mining; brick yards, sinking foundations, coffer dam, sewer, well sinking, and other contractor's work; raising water for any kind of manufacturing or fire purpose.

No.	Size of Steam Pipe, Inches.	Size of Suction Pipe, Inches.	Size of Discharge Pipe, Inches.	Weight, Lbs.	Gallons per Minute at an Elevation of		Price.
					100 feet	150 feet	
1	$\frac{1}{2}$	2	$1\frac{1}{2}$	350	100	50	\$ 150 00
2	$\frac{3}{4}$	3	2	550	200	100	225 00
3	1	4	3	900	300	200	300 00
4	$1\frac{1}{4}$	5	4	1,600	500	400	400 00
5	$1\frac{1}{2}$	6	5	2,300	800	600	500 00
6	2	7	6	2,800	1000	800	600 00
7	$2\frac{1}{2}$	8	7	3,500	2000	1500	800 00
8	3	10	8	4,300	3000	2000	1,000 00

Discount.....

EMERSON PATENTED STEAM PUMP.

A practically indestructible, self-contained noiseless, steam pump, using much less steam per horse power developed than a duplex or pulsometer performing like service. Has no working parts exposed. Will pump water containing large quantities of sand, gravel or grit, and can be used to *bleed* quicksand and make it easy to handle.

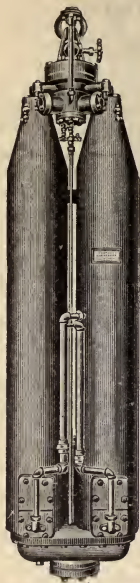


Fig. D. 321.

Number.	Size of Steam Pipe, Inches.	Size of Suction, Inches.	Size of Discharge, Inches.	Capacity in Gallons per Minute.	Capacity in Gallons per Hour.	Approximate Weights in Lbs.	Price List.
1	$\frac{3}{4}$	3	2 $\frac{1}{2}$	225	13500	950	\$275
2	1	4	3	415	24900	1375	350
3	1 $\frac{1}{4}$	5	4	725	43500	1900	500
4	1 $\frac{3}{4}$	6	5	1200	72000	3100	700
5	2	8	6	2100	126000	4400	1,150
6	2 $\frac{1}{2}$	10	8	3275	196500	5400	1,700

Capacities stated in table, in gallons per minute and per hour, are calculated on a head or lift of 20 feet. These diminish at the rate of about 4% for every 10 feet additional head up to 150 feet, the highest head for which we recommend our Standard Pumps.

Pumps entirely of bronze will be made on application at special prices.

Discount.....

THE EMERSON PATENTED FOOT VALVE AND QUICK-CLEANING STRAINER.



Strainer Raised.
Fig. D. 322

Size of Suction Pipe in inches.	Price of Foot Valves and Strainers, complete.	Price of Strainers without Foot Valves.
3	\$ 16 25	\$ 8 12
3 $\frac{1}{2}$	18 00	9 00
4	20 00	10 00
5	26 25	13 12
6	33 00	16 50
7	38 50	19 25
8	44 75	22 37
10	82 00	41 00
12	113 00	56 50

Discount.....



Fig. D. 323.

STEAM PUMPS.

Pulsometer.

Entirely automatic. Has no mechanical parts requiring power to move them, and can be operated by anyone capable of making a few pipe connections. Requires no oil, there being no pistons, glands, stuffing boxes, eccentrics, levers or other complicated mechanism.

The pump is absolutely noiseless. All the steam used is condensed in the Pulsometer, helping to form the vacuum.

Large percentages of sand, grit, thick mud, etc., may pass through this pump without injury.

Pump may also be operated while suspended and can be lowered, raised or swung about without interrupting its work.

Size of Pipes, Inches.				Capacity in gallons per minute at different elevations with Boiler Power and Steam Pressure Usually Provided (Approximate).				List Prices.			Dimensions and Weights.			
Number.	Steam	Suction.	Discharge.	25 Feet.	50 Feet.	75 Feet.	H. P. Required.	Flat Valve. (Standard).	Ball Valve. (Special).	Composition Metal.	Number.	Height, Inches.	Floor Space, Inches.	Weight, Pounds.
2	1	1	1	20	17	13	4	\$ 75	\$79		2	25	14x13	95
3	2	2	2	60	50	38	5	100	106		3	27	17x14	140
4	2	2	2	100	80	65	6	150	158		4	33	19x19	295
5	3	3	3	180	160	115	9	175	187		5	38	21x22	430
6	3	3	3	300	265	200	12	225	241		6	43	23x24	570
7	4	4	4	425	375	275	15	275	300		7	49	25x26	745
8	5	5	5	700	625	450	25	400	440		8	61	32x33	1,375
9	7	7	7	1,000	900	650	35	500	550		9	72	38x36	2,100
10	8	8	8	2,000	1,800	1,400	70	1,000	....	On Application.	10	88	52x45	3,800

Discount.....

The price includes suitable strainer, either basket or mushroom, steam-controlling globe valve with nipple and union, and relief valve.

DEEP WELL SINGLE ACTING PUMP.

"American."

Belt Driven.

The pumps are practical, durable and properly proportioned to stand the wear and tear incident to the varying conditions met in every day work.

Dimensions No. 3½ Deep Well Power Head.

No.	Pipe con. or smaller.†		Stroke.	Geared.	Floor space and height, Inches.	Pulley.*	
	Suct. Ins.	Disch. Ins.				Dia., Ins.	Face, Ins.
3½	12	10	24	8 to 9	58x73x102	40	10
No.	R.P.M.		Total Lifts varying with diam. cylinder feet.		Provide H.P. extra load.		Wt., Lbs.
3½	20 to 30		200 to 600		50		7400~

*For extreme loads increase pulley diameter at added cost.

†If smaller wanted bush openings.

Fig. D. 324.

Steam Driven.

For use in City Water Works, by Factories, Railroads, Mines and Irrigation Projects.

No.	Steam Cylinder.		Water Pipes. *		Dia. Brass Differential Plunger, Ins.	Steam Pipe.		W. R. Couplings takes, Inches.	Apx. Weight, Lbs.
	Diameter, Inches.	Stroke, Inches.	Well, Inches.	Disch., Inches.		Steam, Inches.	Exhaust, Inches.		
4	5	24	4½	3	1½	¾	1	1½	660
5	6	24	5	3½	3	1	1½	1½	820
6	6	36	5	3½	3	1	1½	1½	950
7	8	24	6	4	3	1½	1½	1½	1150
8	8	36	6	4	3	1½	1½	1½	1300
10	10	36	8	6	4	1½	2	1½	1550
12	12	36	8	6	4	2	2½	1½	2280
13	14	36	8	6	4	2½	3	1½	2600

*If smaller wanted bush openings. Nos. 12 and 13 made for 10 and 7 inch if ordered.

Prices on application.

NOTE.—We handle a full line of the "American" well pumps. Write for descriptive matter and prices.



Fig. D. 325.

DOUBLE ACTING FORCE PUMPS.

Climax.

For open tank service, etc. Recommended for strength, durability and ease of operation.

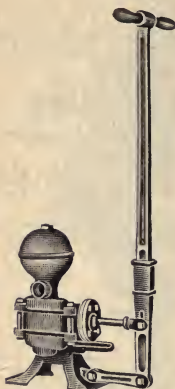


Fig. D. 326.

No.	Size Cyl.	Suction Pipe fitted for.	Discharge Pipe fitted for.	Stroke.	Price Iron.	Price Brass Lined Cylinder.
1	2½ in.	1½ in.	1 in.	4 in.	\$16 00	\$18 00
2	3 in.	1½ in.	1½ in.	4 in.	18 00	21 00

Fitted for other sizes suction and discharge iron pipe, lead pipe or hose, but always as listed for iron pipe, unless otherwise ordered.

Discount.....

Triumph.

These pumps are used extensively in factories, warehouses, etc., for general purposes. As boiler test pumps, they will do excellent service. The cylinders are brass lined and the valves, valve seats and piston rods are made of bronze.

Brass plugs or drip cocks are provided at each end of the bed plate to prevent freezing; also a similar plug is attached to side of cylinder, for priming the pump when necessary. The upper and lower valves are easily accessible by removing the air chamber and cylinder of the pump.

No.	Diam. Cyl.	Suction Pipe fitted for.	Discharge Pipe fitted for.	Stroke.	Price Brass Lined.	Price Brass Cylinder.
1	2½ in.	1½ in.	1 in.	4½ in.	\$27 00	\$55 00
2	3 in.	1½ in.	1 in.	4½ in.	28 00	55 00
3	4 in.	1½ in.	1½ in.	4½ in.	30 00	60 00
4	5 in.	2 in.	1½ in.	5 in.	40 00	90 00

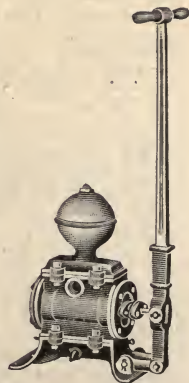


Fig. D. 327.

Fitted for iron pipe as listed, but will be fitted for lead pipe when so ordered.

Discount.....

DIAPHRAGM PUMPS.**With Reversible Levers.**

Used for raising large quantities of water from pits, excavations, etc.
Dirt, sand or gravel will not close them.

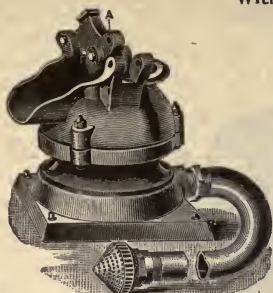
Loud.

Fig. D. 328.
Side Suction.

No.	Suction, Inches.	Capacity, Per Hour.	Bottom Suction, Price.	Side Suction, Price.
1	2½	1500 Gal.	\$18 00	\$20 00
2	3	3500 "	24 00	26 00

Discount.....

Edson.

No.	Capacity, Per Hour.	Suction, Inches.	Price.	
			Side Suction.	Bottom Suction.
2	1800 Gal.	2½	\$19 00	\$14 00
3	4000 "	3	24 00	16 00
4	6000 "	4	35 00	25 00

Discount.....

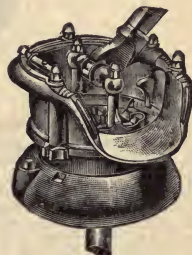


Fig. D. 329.
Bottom Suction.

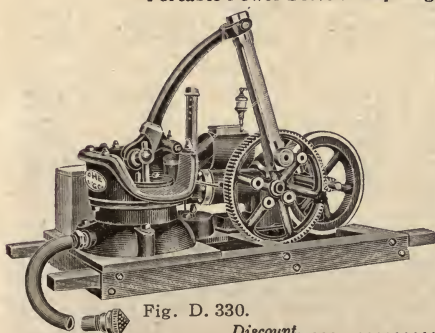
Portable Power Driven Diaphragm Pump.

Fig. D. 330.

Discount.....

► A strong, simple, up to date 3 H. P. water hopper cooled engine, with a capacity of 3,500 gallons per hour. Engine can be regulated to run the pump from 30 to 50 strokes per minute. Gasoline tank holds one gallon which will run the engine eight hours. Side or bottom suction (3-inch) as desired. Entire weight of outfit 630 pounds. Full specifications upon request. Complete with side or bottom suction diaphragm pump, mounted, all connected to run.
Price.....\$135 00

WATER METERS.

Gem "AAX."

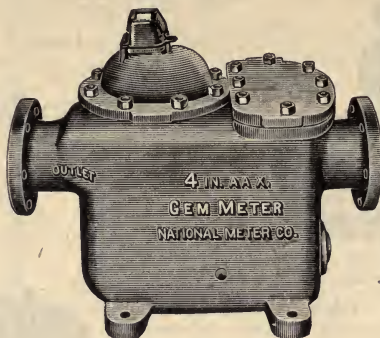


Fig. D. 331.

It will be seen from the cut that the "AAX" Gem is a straight-line meter, and consequently can be very readily connected. It is fitted with the Straight-Reading Register, which has been steadily growing in popularity for several years past.

In the exterior casing of the meter a large compartment is formed, in which brass strainers are placed for the interception of fish, stones and other solids which might destroy the working parts of the meter. This fish trap is arranged with a blow-off, so that it can be cleaned out at any time. It is made for the measurement of large and rapid deliveries of water.

Size.	Quantity Water Discharged Under 60 lbs. Pressure Per Minute.	Length.	Weight of Meter.	Weight, Boxed.	Price Net.
	Cubic Feet				
2 in.	32	17 in.	145 lbs.	180 lbs.	\$ 40 00
3 "	72	24 "	215 "	235 "	80 00
4 "	128	29½ "	417 "	443 "	160 00
6 "	288	36½ "	800 "	840 "	300 00
8 "	550	40 "	990 "	1,035 "	500 00
10 "	800	42 "	1,410 "	1,460 "	600 00
12 "	1,000	46 "	1,600 "	1,675 "	700 00

The "AAX" Gem Meters in the 3, 4 and 6-inch sizes are the same length from end to end as the Crown. The connections referred to in the above table, for all sizes except the 2-inch, consist of one spigot end connection and one bell end connection, and they are included in the price of the meter.

Connections for 12-inch pipe are furnished with 10-inch meters without additional charge.

"AAX" Gem Meters in all sizes up to 48-inch.

WATER METERS.

Crown "A" and "AA."

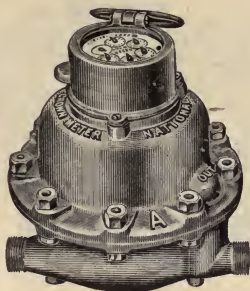


Fig. D. 332.

The Crown is a rotary piston positive displacement meter. Its principal characteristics are: Accuracy of registration, simplicity of construction, durability and compactness.

These meters are furnished in both Straight Reading and Round Dial Registers. The "A" Meter is the Round Dial, and the "AA" the Straight Reading.

Order should specify style desired.

Deliveries, Dimensions and Weights of Crown Meters.

Size.	Greatest Proper Quantity per Minute	Length.	Weight.	Weight Boxed.	Price Net.
	Cubic Feet				
$\frac{3}{4}$ in.	2	$7\frac{1}{2}$ in.	20 lbs.	25 lbs.	\$ 12 00
$\frac{1}{2}$ in.	4	9 "	33 "	42 "	21 00
1 "	8	$10\frac{1}{2}$ "	49 "	63 "	30 00
$1\frac{1}{2}$ "	12	13 "	95 "	120 "	50 00
2 "	20	17 "	142 "	175 "	65 00
3 "	36	24 "	226 "	246 "	125 00
4 "	72	$29\frac{1}{2}$ "	461 "	486 "	225 00
6 "	120	$36\frac{1}{2}$ "	1000 "	1040 "	450 00

Connections for $\frac{3}{4}$ inch Meters 30 cents extra; $\frac{1}{2}$ inch 40 cents; $\frac{3}{4}$ inch 60 cents; 1 inch 80 cents. The $1\frac{1}{2}$ inches and larger sizes include connections for cast or wrought iron pipe without additional charge.

WATER METERS.

Hersey Disc.

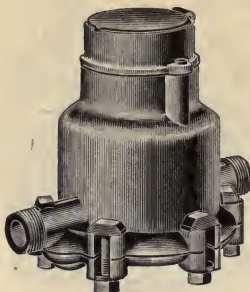


Fig. D. 333.

Companion flanges tapped for wrought iron pipe, or flanged bell and spigot connections for cast iron pipe are furnished, when ordered, without charge.

All meters are fitted with round reading registers, reading in cubic feet unless otherwise ordered. Straight reading registers will be furnished, if ordered, and meters will be adjusted to other units of measurement when specified, without extra charge.

All meters are fitted with sealing screws in bonnets, and when specified, means will be provided for sealing main flanges and pipe connections.

This type of meter is adapted for use on all services where accuracy, reliability and durability are demanded, and at a low first cost.

Sizes, Inches	Prices.		Greatest proper quantity per min.		Weights, Lbs.		Dimensions, Inches.		
	Meters.	Cons.	Cu. ft.	Gals.	Net.	Gross.	Height.	Width.	Length.
1	\$ 8 00	\$0 40	2	15	8	12	6½	5½	7
	12 00	0 60	4	30	12	19	7	7	9
	16 00	0 80	8	60	16	28	7½	8	10½
1½	25 00	No Charge	10	75	25	34	8½	8	9
1¾	30 00		12	90	42	61	9	10½	12
2	50 00	No Charge	20	150	72	99	11	12½	15½
3	85 00		36	270	226	277	16½	18½	24
4	175 00		72	540	415	489	19½	22	29
6	375 00		120	900	775	863	25	27½	36

Discount.....

WATER METERS.

Hersey Torrent.

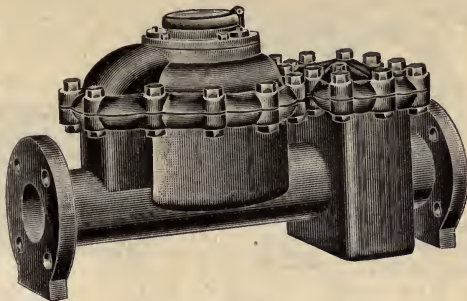


Fig. D. 334.

The 2-inch size is provided with female threads. Galvanized iron union connections are furnished when ordered, without charge.

The 3-inch to 12-inch sizes are provided with standard pipe flanges. Companion flanges tapped for wrought iron pipe or flanged bell and spigot connections for cast iron pipe are furnished when ordered, without charge.

All meters are fitted with round reading registers reading in cubic feet unless otherwise ordered. Straight reading registers will be furnished if ordered and meters will be adjusted to other units of measurement, when specified, without extra charge.

All meters are fitted with sealing screws in bonnets, and when specified, means will be provided for sealing main flanges and pipe connections.

This type of meter is adapted for use on services where it is desired to measure large volumes of water with comparatively small loss of head, such for instance, as city supplies, railroad standpipes, hydrants, elevators, also for water carts, water motors and similar services.

Sizes, Ins.	Prices.		Greatest proper quantity per min.		Weights, Lbs.		Dimensions, Inches.		
	Meters.	Cons.	Cu. ft.	Gals.	Net.	Gross.	Height.	Width.	Length.
2	\$ 40 00	Pipe flanges or bell and spigot cons. No charge	32	240	60	87	11½	8½	15½
3	80 00		72	540	136	184	14½	11	24
4	160 00		128	960	230	309	18½	13½	29
6	350 00		288	2160	439	543	21½	17	36½
8	600 00		550	4125	806	944	26½	20	48½
10	750 00		800	6000	1400	1570	32	24	57
12	900 00		1000	7500	2100	2380	39	30	68

Discount... ..

FLEXIBLE METAL HOSE.

For Steam, Suction, Compressed Air, etc.

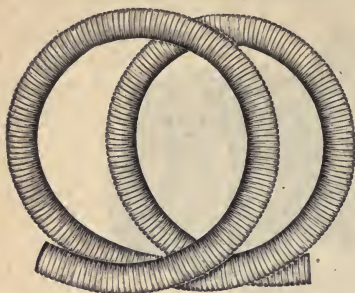


Fig. D. 335.



Fig. D. 336.
Interlocking.

Cannot expand, stretch, flatten or kink.

Internal Diameter in Inches.	For Oils, Gasoline and Ordinary Steam Pressures.		Single Wire Braiding for Heavy Steam Pressures.		For Suction, Cold Water and Com- pressed Air.	
	Steel.	Copper.	Steel.	Copper.	Steel.	Steel, Braided
price per foot.....	\$0 45	\$1 25	\$0 70	\$1 50	\$0 25	\$0 67
" " "	0 55	1 50	0 80	1 75	0 34	0 81
" " "	0 75	1 80	1 00	2 25	0 43	0 97
" " "	0 85	2 05	1 20	2 50	0 56	1 19
1 " " "	0 95	2 65	1 70	3 70	0 81	1 33
1 1/4 " " "	1 30	3 20	2 10	4 85	1 09	1 71
1 1/2 " " "	1 70	4 25	2 75	6 30	1 39	2 40
2 " " "	2 25	5 65	3 50	8 40	2 19	3 16
2 1/2 " " "	3 20	6 75	4 20	10 00	2 78	3 80
3 " " "	3 55	7 90	5 80	14 00	4 03	5 00

Larger sizes, net prices quoted on application.

Discount.....

COUPLINGS.

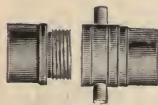


Fig. D. 337.
Soldered Brass, for
Air, Oil and
Water.

Soldered couplings should never be used on steam hose or for any purpose where heat is sufficient to soften solder. Steam couplings are packed in with asbestos and red lead, and will stand heavy pressure and high heat.

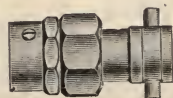


Fig. D. 338.
Packed, for Steam.

Prices on application.

RUBBER HOSE.



Fig. D. 339.

Internal Diameter, Inches.	2-Ply, Per Foot.	3-Ply, Per Foot.	4-Ply, Per Foot.	5-Ply, Per Foot.	6-Ply, Per Foot.
$\frac{3}{4}$	\$0 20	\$0 25	\$0 30	\$0 37	\$0 45
$1\frac{1}{4}$	25	30	37	46	55
1.....	33	40	50	62	75
$1\frac{1}{2}$	42	50	62	77	93
$1\frac{3}{4}$	50	60	75	93	1 12
$2\frac{1}{4}$	58	70	87	1 08	1 30
2.....	66	80	1 00	1 25	1 50
$2\frac{1}{2}$	75	90	1 12	1 40	1 68
$2\frac{3}{4}$	83	1 00	1 25	1 56	1 87
$3\frac{1}{4}$	92	1 10	1 37	1 71	2 05
3.....	99	1 20	1 50	1 87	2 25
$3\frac{3}{4}$	1 16	1 40	1 75	2 18	2 62
4.....	1 32	1 60	2 00	2 50	3 00
5.....	1 65	2 00	2 50	3 13	3 75
6.....	1 98	2 40	3 00	3 75	4 50
7.....	2 31	2 80	3 50	4 38	5 25
8.....	2 64	3 20	4 00	5 00	6 00
9.....	2 97	3 60	4 50	5 63	6 75
10.....	3 33	4 00	5 00	6 25	7 50

Discount.....

STEAM AND AIR-BRAKE HOSE.

Internal Diameter, Inches.	3-Ply, Per Foot.	4-Ply, Per Foot.	5-Ply, Per Foot.	6-Ply, Per Foot.	7-Ply, Per Foot.	8-Ply, Per Foot.
$\frac{3}{4}$	\$0 47	\$0 56	\$0 70	\$0 84	\$0 98	\$1 12
$1\frac{1}{4}$	57	71	87	1 05	1 23	1 41
1.....	70	87	1 07	1 28	1 50	1 70
$1\frac{1}{2}$	85	1 04	1 30	1 56	1 82	2 08
$1\frac{3}{4}$	1 02	1 25	1 56	1 87	2 18	2 50
$2\frac{1}{4}$	1 18	1 45	1 81	2 17	2 53	2 90
2.....	1 34	1 66	2 07	2 49	2 90	3 32
$2\frac{1}{2}$	1 50	1 87	2 33	2 80	3 27	3 74
$2\frac{3}{4}$	1 66	2 08	2 60	3 12	3 64	4 16
3.....	2 00	2 80	3 50	4 20	4 90	5 60

*Intermediate sizes are charged at the list price of the next larger size; that is, $1\frac{1}{4}$ inch is sold by $1\frac{1}{2}$ inch list, etc.

Discount.....

AIR-BRAKE HOSE.



Fig. D. 340.

50-Foot Lengths.

1-inch int. diam. . . . per foot, \$0 87, 1½ inch int. diam. per foot \$1 04

20 to 24-Inch Lengths.

1-inch int. diam. per length, \$2 00, 1½ inch int. diam. per length, 2 50
Ends capped and enlarged.

Discount.

AIR DRILL HOSE.

Air Drill Hose is made to withstand high pressure and rough usage. It is usually made with one-ply of frictioned duck on the outside, which makes a strong and durable cover.

We furnish this hose marline wound, steel armor protected, woven marline or cotton covered, and for special conditions where the hose is subjected to acids or acid fumes, we make it with an especially heavy rubber cover to withstand the action of the same.

Inside Diameter, Inches.	Price, per Foot			
	3-Ply, 2-Ply Inside, 1-Ply Outside	4-Ply, 3-Ply Inside, 1-Ply Outside	5-Ply, 4-Ply Inside, 1-Ply Outside	6-Ply, 5-Ply Inside, 1-Ply Outside
¾	\$0 47	\$0 56	\$0 70	\$0 84
1	57	71	87	1 05
1¼	70	87	1 07	1 28
1½	85	1 04	1 30	1 56
1¾	1 02	1 25	1 56	1 87
2	1 18	1 45	1 81	2 17
2¼	1 34	1 66	2 07	2 49
2½	1 66	2 08	2 60	3 12
3	2 00	2 80	3 50	4 20

Frictioned duck outside counts as one-ply.

LIST PRICES FOR WINDING HOSE.

With Marline, Round or Flat Wire.

Size.	3-Ply, Per Foot.	4-Ply, Per Foot.	5-Ply, Per Foot.	6-Ply, Per Foot.
¾ Inch	\$0 08	\$0 10	\$0 12	\$0 14
¾ "	11	13	16	19
1 "	14	16	20	24
1¼ "	17	20	25	30
1½ "	20	24	30	36
1¾ "	23	28	35	42
2 "	26	32	40	48
2¼ "	29	36	45	54
2½ "	32	40	50	60

Discount.

COTTON FIRE HOSE.

Rubber Lined.

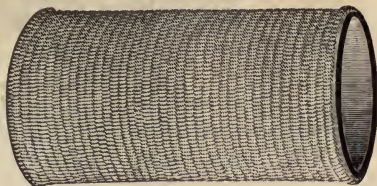
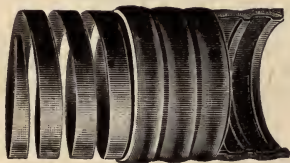


Fig. D. 341.

Size, inches	1	1½	1½	2	2½
Price, per foot.	\$0 40	\$0 45	\$0 50	\$0 65	\$0 80

Discount**SUCTION HOSE.**

Int. Diam.	Per ft.	Int. Diam.	Per ft.
2½-inch	\$3 10	6-inch	\$ 9 50
3 "	4 00	6½ "	10 50
3½ "	4 90	7 "	12 00
4 "	5 80	8 "	15 00
4½ "	6 70	9 "	17 50
5 "	7 60	10 "	20 00
5½ "	8 50	12 "	25 00

Discount

Fig. D. 342.

SUCTION HOSE.

Smooth Bore.

Int. Diam.	Per ft.	Int. Diam.	Per ft.
2-inch	\$2 60	6-inch	\$10 50
2½ "	3 50	6½ "	12 00
3 "	4 50	7 "	13 50
3½ "	5 50	7½ "	15 00
4 "	6 50	8 "	16 50
4½ "	7 50	9 "	19 50
5 "	8 50	10 "	22 50
5½ "	9 50	12 "	27 50

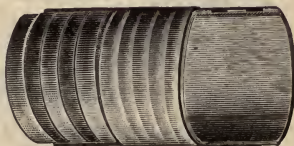
Discount

Fig. D. 343.

This hose is far superior to the ordinary suction hose. The galvanized iron coil being securely enclosed in smooth rubber walls, it is thereby protected from the action of water passing through it, and the friction occasioned by the rough inside surface of ordinary suction is entirely avoided.

When ordering suction hose please state whether it is desired with nipples wired in. If not, state whether hose is to be used with nipples or couplings, so ends can be made accordingly.

HOSE FITTINGS.

Couplings.

Fig. D. 344.
For Water Hose.Fig. D. 345.
For Steam Hose.

List, per Dozen.

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
For Water, Hose Pipe Thread.....	\$2 40	2 40	4 40	10 00	14 00	24 00	48 00	75 00
For Water, Iron Pipe Thread.....	2 65	2 65	4 65	10 50	15 00	26 00	50 00	76 00
For Steam, Hose Pipe Thread.....	15 00	15 00	18 00	24 00	30 00	42 00	72 00	.....
Size, inches.....	$3\frac{1}{2}$	4	5	6	8			
For Water, Iron Pipe Thread.....	120 00	150 00	250 00	350 00	504 00			

NOTE.—Couplings with Hose Pipe Thread will always be sent if not otherwise ordered. $3\frac{1}{2}$ to 8-inch, inclusive, are made with Iron Pipe Thread unless otherwise ordered.

Discount.....

Hose Clamps.



Fig. D. 346.

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$
Per doz., water hose	\$1 50	1 50	2 00	2 50	3 00
Per doz., steam hose	2 00	2 00	2 50	3 00	3 50
Size, inches.....	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Per doz., water hose	4 00	7 00	10 00	24 00	30 00

Discount.....

Hose Nipples.

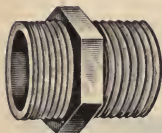


Fig. D. 347.

Size, inches..	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$
Price each...	\$0 30	0 30	0 42	0 75	0 85
Size, inches..	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Price each...	1 20	2 35	3 35	4 20	6 25

Discount.....

Hose Nozzles.



Screw Tips. Fig. D. 348.

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
Length.....	$7\frac{1}{2}$	12	$8\frac{1}{2}$	$12\frac{1}{2}$	12	15	15
Hose Pipe Thread, each	\$0 65	0 85	0 85	1 25	1 75	2 10	2 30
Iron	0 75	0 95	0 95	1 35	1 85	2 40	2 60
Size, inches.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Length.....	19	20	24	30	36	36	36
Hose Pipe Thread, each	3 50	5 00	8 50	12 00	13 25	13 25	13 25
Iron	2 75	5 25	8 80	12 50	13 75	13 75	13 75

Discount.....

HOSE RACK.

"Wirt's Royal."

Body of rack is made of steel pressed into shape forming cover over hose, protects hose from dust, malleable iron fittings, zinc pins attached to rack. May be attached to wall, stand pipe or to nipple below valve.

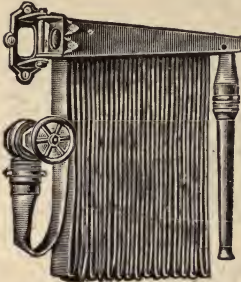


Fig. D. 349.

	18	19
Japanned Red on Iron.....	\$ 5 00	\$ 6 00
Gold or Aluminum Bronzed.	5 00	6 00
White Enamel on Iron.....	6 00	7 00
Nickel or Copper Plate on Iron.....	7 00	8 00
Solid Brass, Polished or Nickel-plated.....	11 00	13 00

Discount.....

No. 18 holds 25 to 75 feet unlined linen hose.
No. 19 holds 100 to 150 feet unlined linen hose.
In ordering specify size of hose.
No extra charge for pipe clamps up to and including 2½ inches.

WIRT'S HUMP RACK.

Malleable Iron. Steel Tubing. Steel Rod.

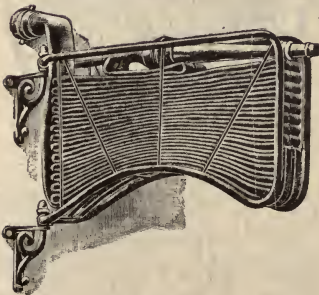


Fig. D. 350.

Can be attached to wall or stand pipe.

No.	Capacity.	Size Hose, Unlined Linen.	Price.
AO..	50 ft.	1½ or 1½ inches..	\$5 00
AOX.	50 ft.	2 inches.....	5 00
AOO.	50 ft.	2½ "	5 00
A1...	100 ft.	1½ or 1½ inches..	6 00
A1X.	100 ft.	2 inches.....	6 00
A2...	100 ft.	2½ "	6 00
A3...	150 ft.	1½ or 1½ inches..	7 00
A3X.	150 ft.	2 inches.....	7 00
A4...	150 ft.	2½ "	7 00
A5...	200 ft.	1½ or 1½ inches..	7 50
A5X.	200 ft.	2 inches.....	7 50
A6...	200 ft.	2½ "	8 00

Discount.....

Cotton Rubber Lined Mill Hose on Hump Racks:

50 ft. on A3, A3X, A4.

100 ft. on A5, A5X, A6.

No extra charge for pipe clamps up to and including 4-inch.

WIRT'S WALL HOSE REEL.
Malleable Iron. Steel Tubing. Steel Rod.
Can be attached to wall or stand pipe.



Fig. D. 351.

No extra charge for pipe clamps up to and including 4-inch.

No.	Capacity.	Size Hose, Unlined Linen.	Price.
0	50 ft.	1½ or 1¾ inches.....	\$ 6 00
00	50 ft.	2 inches.....	6 00
000	50 ft.	2½ ".....	6 00
1	100 ft.	1½ or 1¾ inches.....	6 00
2½	100 ft.	2 inches.....	6 00
3½	100 ft.	2½ ".....	6 00
2	150 ft.	1½ or 1¾ inches.....	6 00
3	150 ft.	2 inches.....	6 00
4	150 ft.	2½ ".....	6 50
5½	200 ft.	1½ or 1¾ inches.....	7 00
6½	200 ft.	2 inches.....	7 50
7½	200 ft.	2½ ".....	8 00
7	300 ft.	2½ ".....	8 50
8	400 ft.	2½ ".....	11 50

Discount.....
Cotton Rubber Lined Hose on Wall Reels:
50 ft. on Nos. 2, 3, 4.
100 ft. on Nos. 5, 6, 7.
150 ft. on No. 8.

VILLAGE HOSE CARTS.

They are of medium weight, very strong, and will endure extremely rough usage

They are mounted on wood wheels of the very best pattern; have tool box and friction roller at rear, rope reel and drag rope, nozzle holder on tongue and tongue rest. Equipped with fireman's axe and crowbar in spring holders. Hub caps are polished brass, or nickel plated if desired. Finished in vermilion and handsomely striped. For roller bearings, add \$35.00 to list prices.

Without rope, reel and rope, deduct \$16.00 from list price.

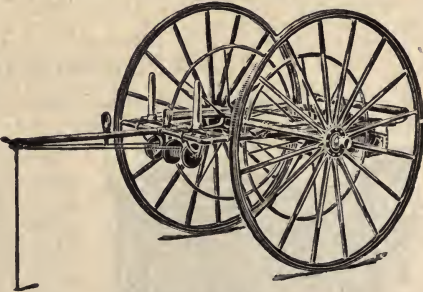


Fig. D. 352.
Style M.

	No. of Carts.	419	420	421	422
Height of Wheels.....		4 ft. 6 in.	5 ft.	5 ft. 6 in.	6 ft.
Extreme Outer Width.....		5 ft.	5 ft.	5 ft. 4 in.	5 ft. 8 in.
Extreme Length.....		8 ft. 6 in.	9 ft.	9 ft. 6 in.	10 ft. 8 in.
Weight, complete.....		300 lbs.	340 lbs.	430 lbs.	500 lbs.
Shipping Weight, crated....		400 lbs.	450 lbs.	540 lbs.	630 lbs.
Capacity, 2½-inch Double Jacket Fire Hose.....		300 ft.	400 ft.	500 ft.	600 ft.
Price.....		\$120 00	\$130 00	\$160 00	\$190 00

Carts can be equipped with automatic gongs at following prices: 8-inch, \$8.00; 10-inch, \$9.25 each *net* additional.

Discount.....

PORTABLE HOSE CARTS.

Wirt's Fire Jumper.

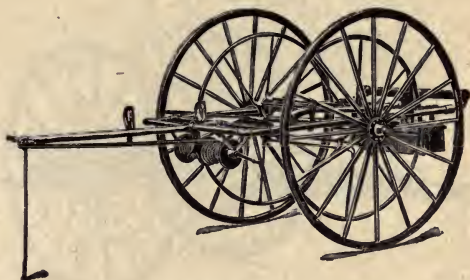


Fig. D. 353.
Style IX.

Is mounted on wooden wheels, has rope reel and drag rope, tool box, axe in spring holder, nozzle holder and friction roller. A very convenient cart for factories, mills, railroad yards, etc., where light service is required.

Without rope, reel and rope, axe and axe holders, deduct \$20.00 from list.

	No. of Jumper.	3½	4½	5½
Height of Wheels.....		44 in.	48 in.	52 in.
Extreme Width.....		48 in.	54 in.	54 in.
Weight, complete.....		200 lbs.	250 lbs.	275 lbs.
Shipping Weight, crated.....		250 lbs.	310 lbs.	350 lbs.
Capacity, 2½-inch Double Jacket Fire Hose.....		150 ft.	250 ft.	350 ft.
Capacity, 2½-inch Cotton Rubber-lined Mill Hose.....		300 ft.	400 ft.	500 ft.
Price.....		\$80 00	\$90 00	\$100 00

These carts furnished with steel wheels, add \$10.00 each to list prices.

Discount.....

PORTABLE HOSE CARTS.

Wrought Frame.

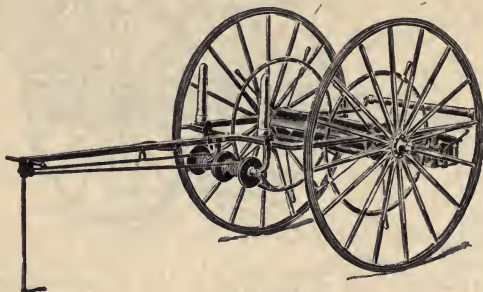


Fig. D. 354.
Nos. 55 and 56.

An exceedingly well made, low priced cart, with tool box, friction roller in rear, rope reel and rope, two cone pipe holders. All nicely painted and striped. Without rope reel and rope, deduct \$16.00 from list price.

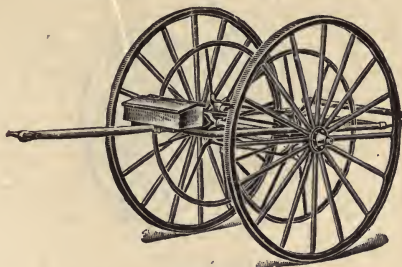
Number of Carts.....	55	56
Height of Wheels.....	52 in.	60 in.
Extreme Width of Cart.....	50 in.	60 in.
Extreme Length of Cart.....	8 ft. 4 in.	9 ft.
Weight, Complete.....	220 lbs.	310 lbs.
Shipping Weight, crated.....	300 lbs.	400 lbs.
Capacity of 2½-in. Cotton Rubber-lined Mill Hose.....	500 ft.	800 ft.
Capacity of 2½-in. Double Jacket or Rubber Hose.....	300 ft.	500 ft.
List Price.....	\$95 00	\$105 00

Carts can be equipped with automatic gongs at following prices: 8-inch \$8.00; 10-inch, \$9.25, each, net additional.

Discount.....

PORTABLE HOSE CARTS.

For Warehouse, Factory, Mill, Etc.

Fig. D. 355.
Style O.

These carts are made in four sizes. They are substantially built, and capable of withstanding rough usage. The frame and reel are made of tubular steel and the wheels are wood. They have tool box in front and friction roller at rear. Neatly painted and striped.

Number of Carts.....	440	441	442	443
Height of Wheels.....	40 in.	44 in.	48 in.	52 in.
Extreme Outer Width.....	38 in.	42 in.	48 in.	54 in.
Extreme Length.....	5 ft. 6 in.	6 ft. 2 in.	6 ft. 6 in.	7 ft.
Weight, Complete.....	95 lbs.	165 lbs.	180 lbs.	210 lbs.
Shipping Weight, crated.....	110 lbs.	180 lbs.	200 lbs.	230 lbs.
Capacity, 1½-in. Cotton Rubber-lined Mill Hose.....	400 ft.	500 ft.	650 ft.	800 ft.
Capacity, 2-in. Cotton Rubber-lined Mill Hose.....	250 ft.	350 ft.	500 ft.	600 ft.
Capacity, 2½-in. Cotton Rubber-lined Mill Hose.....	200 ft.	300 ft.	400 ft.	500 ft.
Price.....	\$35 00	\$45 00	\$55 00	\$65 00

These carts furnished with steel wheels, add \$5.00 each to list.

Discount.....

PORTABLE HOSE REELS.

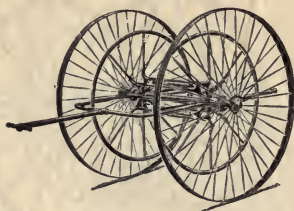


Fig. D. 356.

Style E: Nos. 90, 100 and 110.

Style F: Nos. 101, 102 and 103.

	STYLE E.			STYLE F.		
Number of Reel.....	90	100	110	101	102	103
Height of Wheels.....	36 in.	36 in.	38 in.	42 in.	48 in.	52 in.
Extreme Outside Width.....	31 in.	33 in.	38 in.	42 in.	48 in.	54 in.
Weight of Carts, complete....	75 lb.	90 lb.	100 lb.	145 lb.	175 lb.	200 lb.
Capacity of $\frac{3}{4}$ -in. 3-ply Rubber Hose.....	500 ft.	600 ft.	800 ft.	.....	.....	.....
Capacity of 1-in. 4-ply Rubber Hose.....	200 ft.	300 ft.	400 ft.	.....	.....	.....
Capacity of $1\frac{1}{4}$ -in. 4-ply Rubber Hose.....	150 ft.	200 ft.	300 ft.	.....	.....	.....
Capacity of $1\frac{1}{2}$ -in. 4-ply Rubber Hose.....	100 ft.	150 ft.	200 ft.	250 ft.	400 ft.	500 ft.
Capacity of 2-in. 4-ply Rubber Hose.....	.....	.....	.....	200 ft.	300 ft.	400 ft.
Capacity of $2\frac{1}{2}$ -in. 4-ply Rubber Hose.....	300 ft.	400 ft.	500 ft.	150 ft.	250 ft.	300 ft.
Capacity of $1\frac{1}{4}$ -in. Cotton Rubber-lined Hose.....	200 ft.	300 ft.	400 ft.	500 ft.	650 ft.	800 ft.
Capacity of 2-in. Cotton Rubber-lined Hose.....	150 ft.	200 ft.	250 ft.	350 ft.	500 ft.	600 ft.
Capacity of $2\frac{1}{2}$ -in. Cotton Rubber-lined Hose.....	100 ft.	150 ft.	200 ft.	250 ft.	400 ft.	500 ft.
Price.....	\$12 00	\$17 00	\$25 00	\$35 00	\$45 00	\$55 00

Discount.....

PORTABLE HOSE REELS.

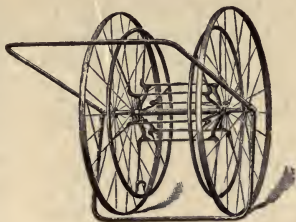


Fig. D. 357.

Style C: Nos. 21, 31 and 32.

Style D: Nos. 41, 51 and 61.

	STYLE C.			STYLE D.		
Number of Reel.....	21	31	32	41	51	61
Height of Wheels.....	28 in.	34 in.	38 in.	42 in.	48 in.	52 in.
Outside Width over all.....	26 in.	27 in.	38 in.	38 in.	46 in.	52 in.
Weight of Reel, bundled for shipping.....	40 lb.	50 lb.	100 lb.	150 lb.	185 lb.	200 lb.
Capacity of $\frac{3}{4}$ -in. 3-ply Rubber Hose.....	200 ft.	500 ft.	800 ft.	.....	.....	.....
Capacity of 1-in. 4-ply Rubber Hose.....	100 ft.	200 ft.	350 ft.	.....	.....	.....
Capacity of 1 $\frac{1}{4}$ -in. 4-ply Rubber Hose.....	75 ft.	150 ft.	250 ft.	.....	.....	.....
Capacity of 1 $\frac{1}{2}$ -in. 4-ply Rubber Hose.....	.....	.....	.....	250 ft.	400 ft.	500 ft.
Capacity of 2-in. 4-ply Rubber Hose.....	.....	.....	.....	200 ft.	300 ft.	400 ft.
Capacity of 2 $\frac{1}{2}$ -in. 4-ply Rubber Hose.....	.....	.....	.....	150 ft.	250 ft.	300 ft.
Capacity of 1 $\frac{1}{2}$ -in. Cotton Rubber-lined Hose.....	100 ft.	200 ft.	350 ft.	500 ft.	650 ft.	800 ft.
Capacity of 2-in. Cotton Rubber-lined Hose.....	75 ft.	150 ft.	250 ft.	350 ft.	500 ft.	600 ft.
Capacity of 2 $\frac{1}{2}$ -in. Cotton Rubber-lined Hose.....	50 ft.	100 ft.	200 ft.	250 ft.	400 ft.	500 ft.
Price.....	\$7 50	\$10 50	\$25 00	\$35 00	\$45 00	\$55 00

Discount.....

THE HARDEN STAR HAND GRENADE FIRE EXTINGUISHER.



Fig. D. 358.

The extinguisher consists of a glass globe, hermetically sealed, filled with a chemical fluid which does not deteriorate with age, is not affected by any climate, will resist a temperature of 20 degrees below zero, and is perfectly harmless to flesh or fabric.

Pints.....	per doz.	\$10 00
Quarts.....	" "	18 00

Discount.....

Holders, for use in cars, etc., 10 to 50 cents each, according to style and finish.

FIRE EXTINGUISHERS.

The "Aaron."

The Aaron Fire Extinguisher will extinguish all fires that water will extinguish and all fires that water will not extinguish, and is so simple in construction and operation that any man, woman or child can operate it on a fire as well as an experienced fireman.

The instructions for using the extinguisher are on the brass plate on the front of the extinguisher.

Every machine is tested, before it leaves our factory to 350 pounds pressure to the square inch, and is capable of withstanding four times the pressure possible to generate.

Approved under supervision of the National Board of Underwriters.

The extinguisher consists of a three-gallon copper cylinder with brass screw top, chemically treated rubber hose and a chemical bottle held by a metal cage. The cylinder is strong and the bottle cage is very simple. A loose, tapered stopper fits in the chemical bottle, and when the extinguisher is turned bottom end up for use on a fire this stopper falls away from the mouth of the bottle and allows the chemical in the bottle to flow into the larger body of chemical in the cylinder, and immediately a stream of carbonic acid gas is thrown in dense vapor form to a distance of 50 feet, extinguishing all classes of fire instantly.

Price, each..... \$15 00

Discount.....



Fig. D. 359.

3 Gallon Capacity.

FIRE EXTINGUISHERS.

"Gold Medal."



Fig. D. 360.

"Gold Medal."

The *Gold Medal Fire Extinguisher* is constructed of heavy cold-rolled Lake Superior copper, with fittings of homogeneous red brass. All copper and brass parts are lined with lead, making the extinguisher absolutely non-corrosive. The hose is of best quality chemically treated rubber, and the nozzle is of lead, without stop-cocks or valves to corrode, stick or get out of order. Tested to 350 pounds to the square inch.

It need never be recharged until used on a fire. The chemical bottle is hermetically sealed; therefore the chemicals can neither be weakened by the absorption of water nor by evaporation.

It may be accidentally turned over or turned partially or wholly upside down and yet not be discharged before the fire is reached, as it takes a positive act to discharge it, i. e., the striking of the plunger on the ground or floor to break the chemical bottle, after the extinguisher is inverted and in position for work on the fire. Two chemical charges furnished with each extinguisher.

Price, 5-gallon, with straps for shoulders and shut-off nozzle.....	\$25 00
Extra bottles of Chemical, per doz.....	4 00
Extra packages of Bi-carbonate Soda, per doz.....	3 00
Price, 3-gallon.....	16 50
Price, 1½-gallon.....	15 00
Extra bottles of Chemical, per doz.....	3 00
Extra packages of Bi-carbonate Soda, per doz.....	2 50

Discount.....

Note.—When ordering "charges" specify whether Chemical or Bi-carbonate Soda, or both, are wanted.

"Patrol."

The "Patrol" Extinguisher is of the tip-over type, and is made expressly for commercial use of all kinds. Being properly filled ready for service, it is simply grasped by hand, turned over quickly and instantly produces a powerful stream. Anyone can operate it easily. It consists of a copper cylinder 21½ inches in height and 7 inches in diameter, filled nearly to the top with water. Into this water is mixed 1½ pounds Bi-carbonate of Soda. In the head of the extinguisher, which is detachable, is a brass cage containing a bottle half full of Sulphuric Acid (four fluid ounces). The acid bottle is closed by a loose lead stopper. To discharge, the extinguisher is inverted. The lead stopper at once drops from the bottle, the sulphuric acid mixes with the soda solution and a large volume of carbonic acid gas is formed.

The shell is seamless and made to withstand a pressure of 350 pounds.

Inspected, approved and labeled by the underwriters laboratories under supervision of the National Board of Fire Underwriters.

Capacity, 3 gallons, Price, each.....\$15 00

Discount.....

Fig. D. 361
"Patrol."

WATERPROOF OILED CLOTHING.

Black or Yellow.

DOUBLE



CLOTHING.

STYLE	Measurements			Per doz.			
				Fish Brand		Shield Brand	
	Length.	Center of Back	Breast	Yellow	Black	Yellow	Black
Slickers.....	54" to 60"	30" to 33"	50" to 56"	\$30 00	\$31 25	\$25 00	\$26 25
Medium Long Coats...	44"	30" to 33"	50" to 56"	24 00	25 25	21 00	22 25
Frocks or Half Coats...	38"	32" to 35"	48" to 54"	21 00	22 25	18 00	19 00
Jackets.....	30" & 31"	32" to 35"	48" to 54"	14 50	15 00	12 50	13 00
	Waist	Leg	Bottom of Leg				
Overalls with Aprons...	42" to 48"	29" to 32"	23"	14 50	15 00	12 50	13 00
String Pants.....	42" to 48"	27" to 30"	23"	14 00	14 50	12 00	12 50

Discount.....

Black Fish Brand Motorman's Coat.

With Ball and Socket Buttons and Thompson's Clasp, per doz.....\$34 00

Discount.....

HATS.

	SIZE, Inches.	Per doz.	
		Yellow.	Black.
Soft.....	7 — 7½ — 7¾ — 7⅞.....	\$7 50	\$7 50
Cape Ann.....	6½ — 7 — 7½ — 7¾.....	5 50	5 50
Fish Brand.....	6½ — 7 — 7½ — 7¾.....	.....	5 00
Squam.....	6½ — 7 — 7½ — 7¾.....	3 25	3 25

Discount.....

RUBBER BOOTS.

Hip Boots.....per pair, \$7 00
 Knee Boots....." 5 00

Discount.....

RUBBER GLOVES.

Gauntlet Gloves.....per pair, \$3 00
 Extra Heavy Driving....." 4 00
 Extra Long....." 5 00

Discount.....

STANDARD STEAM, GAS AND WATER PIPE.

List Price of

Black and Galvanized.

Nominal Inside Diameter Standard Pipe.	Price per Foot, Standard Pipe.	Nominal Weight per Foot, Standard Pipe Pounds.	Price per Foot, Extra Heavy Pipe.	Price per Foot, Double Extra Heavy Pipe.
$\frac{1}{8}$	\$0 05 $\frac{1}{2}$	.245	\$0 12	.....
$\frac{1}{4}$	06	.425	07 $\frac{1}{2}$	.....
$\frac{3}{8}$	06	.568	07 $\frac{1}{2}$	.....
$\frac{1}{2}$	08 $\frac{1}{2}$	.852	11	\$0 32
$\frac{3}{4}$	11 $\frac{1}{2}$	1.134	15	35
1	17	1.684	22	37
1 $\frac{1}{4}$	23	2.281	30	52
1 $\frac{1}{2}$	27 $\frac{1}{2}$	2.731	36 $\frac{1}{2}$	65
2	37	3.678	50 $\frac{1}{2}$	91
2 $\frac{1}{2}$	58 $\frac{1}{2}$	5.819	77	1 37
3	76 $\frac{1}{2}$	7.616	1 03	1 86
3 $\frac{1}{2}$	92	9.202	1 25	2 30
4	1 09	10.889	1 50	2 76
4 $\frac{1}{2}$	1 27	12.642	1 80	3 26
5	1 48	14.810	2 08	3 86
6	1 92	19.185	2 86	5 32
7	2 38	23.769	3 81	6 35
8	2 50	25.000	4 34	7 25
8	2 88	28.809	.....	.....
9	3 45	34.188	4 90	.....
10	3 20	32.000	5 48	.....
10	3 50	35.000	.....	.....
10	4 12	41.132	.....	.....
11	4 63	46.247	6 10	.....
12	4 50	45.000	6 55	.....
12	5 07	50.706	.....	.....
13	5 60	55.824	.....	.....
14	6 10	60.375	.....	.....
15	6 50	64.500	.....	.....

Standard pipe cut to lengths lower discount two points threading and cutting added.

Extra and double extra strong pipe Random lengths with threads only lower discount 1 $\frac{1}{2}$ points; with threads and couplings lower discount three points.

Reaming pipe extra equal to cost of one thread per length reamed.

STANDARD STEAM, GAS AND WATER PIPE.

Threads.

Size, inches....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
List, each.....	05	05	05	05	05	06	07	08	10
Size, inches....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
List, each.....	15	20	25	35	45	55	70	85	1 00
Size, inches....	9	10	11	12					
List, each.....	1 25	1 50	2 00	2 50					

Discount.....

Cutting pipe only, one-half cost of threading.

THE "REX" PIPE BENDER.

(Patents Pending.)

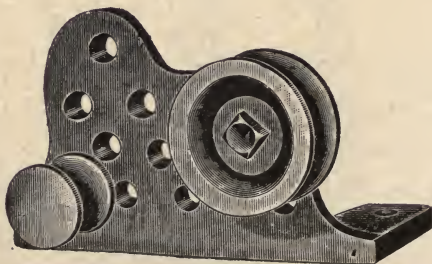


Fig. D. 362.

With this tool you can bend pipe from $\frac{1}{8}$ in. to $1\frac{1}{4}$ in. Conduit pipe from $\frac{1}{2}$ in. to $1\frac{1}{4}$ in.

List price, each.....\$6 00

Discount.....

PIPE FITTINGS.

Elbows.

Fig. D. 363.
Cast.Fig. D. 364.
Malleable.

Size.....Inches.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Cast, R. H.....Ea.	05	05	06	08	10 $\frac{1}{2}$	16	20	28	50	75
" R. and L....Ea.	06	06	07	09	12	18	23	32	60	85
" R.H.Galv....Ea.	10	10	12	16	21	32	40	56	1 00	1 50
" Pitched.....Ea.				10	13	20	25	35	65	1 00

Size.....Inches.	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7	8	9	10	12
Cast, R. H.....Ea.	1 05	1 20	1 75	2 00	2 75	4 70	6 75	9 00	13 50	20 00
" R.H.Galv....Ea.	2 10	2 40	3 50	4 00	5 50	9 40	13 50	18 00	27 00	40 00
Price, Pitched....Ea.	1 30	1 50								

Size.....Inches.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$		
Mall., R. H.....Ea.	06	07	08	10	15	22	25	35		
" R. and L....Ea.		09	11	13	17	25	30	40		
" Galv., R.H. Ea.	08	09	11	14	20	32	40	60		

Size.....Inches.	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6		
Mall., R. H.....Ea.	50	90	1 50	2 25	3 00	3 50	4 00	6 50		
" R. and L....Ea.	65									
" Galv., R.H. Ea.	90	1 50	2 60	3 75	5 00		6 50	10 00		

Discount.....

45 Degree Elbows.

Fig. D. 365.
Cast.Fig. D. 366.
Malleable.

Size.....Inches.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$
Price, Cast.....Ea.	06	07	10	12	19	24	34	60	90	1 25
Cast, Galv.....Ea	12	14	20	24	38	48	68	1 20	1 80	2 50

Size.....Inches.	4	4 $\frac{1}{2}$	5	6	7	8	9	10	12	
Price, Cast.....Ea.	1 45	2 20	2 50	3 45	5 90	8 50	11 25	17 00	25 00	
Cast, Galv.....Ea.	2 90	4 40	5 00	6 90	11 80	17 00	22 50	34 00	50 00	

Size.....Inches.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2		
Price, Mall.....Ea.	08	10	12	18	26	36	54	82		
Mall., Galv.....Ea.	12	15	20	25	40	50	85	1 35		

Size.....Inches.	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7		
Price, Mall.....Ea.	1 25	2 50	3 25	4 50	5 25	6 00	7 50			
Mall., Galv.....Ea.	1 90	3 75	4 75	6 75		9 00	11 00			

Discount.....

PIPE FITTINGS.

Reducing Elbows.

Fig. D. 367.
Cast.

Size.....Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Price.....Ea.	07	09	12	18	23	32	60	85	1 20
Price, Galv...Ea.	14	18	24	36	46	64	1 20	1 70	2 40
Size.....Inches	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Price.....Ea.	1 40	2 00	2 30	3 15	5 40	7 75	10 50	15 50	23 00
Price, Galv...Ea.	2 80	4 00	4 60	6 30	10 80	15 50	21 00	31 00	46 00

Discount.....

Tees.

Fig. D. 368
Cast.Fig. D. 369.
Malleable.

Size.....Inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Cast.....Ea.	08	08	09	12	15	23	29	41	73	1 10
" Price, Galv..Ea.	16	16	18	24	30	46	58	82	1 46	2 20
Size.....Inches	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Cast.....Ea.	1 50	1 75	2 55	3 00	4 00	6 80	9 75	13 00	19 50	29 00
" Price, Galv..Ea.	3 00	3 50	5 10	6 00	8 00	13 60	19 50	26 00	39 00	58 00
Size.....Inches	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$		
Mall.....Ea.	07	08	09	11	15	25	30	45		
Mall., Galvanized Ea.	09	10	13	16	20	38	50	70		
Size.....Inches	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6		
Mall.....Ea.	60	1 05	1 70	2 50	3 40	4 25	5 00	7 75		
Mall., Galvanized Ea.	1 00	1 90	3 00	4 25	5 75		8 00	12 00		

Discount.....

Reducing Tees.

Size.....Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Cast.....Ea.	10	14	17	27	33	47	83	1 25	1 75
Cast, Galvanized...Ea.	20	28	34	54	66	94	1 66	2 50	3 50
Size.....Inches	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Cast.....Ea.	2 00	2 95	3 50	4 60	7 80	11 25	15 00	22 50	33 50
Cast, Galvanized...Ea.	4 00	5 90	7 00	9 20	15 60	22 50	30 00	45 00	67 00

Discount.....

**PIPE FITTINGS.****Caps.****Fig. D. 373.**

Sizeinches.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
MallEa.	03	04	05	08	12	16	24
Mall., Galvanized .. Ea.	04	05	08	12	17	24	38
SizeInches.	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
MallEa.	32	45	85	1 00	1 20	2 50	3 50
Mall., Galvanized.. Ea.	52	76	1 30	1 60	2 00		

SizeInches.	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
CastEa.	87	1 05	1 20	1 55	2 50	2 85	4 75	5 50	7 00
Cast, Galvanized..Ea.	1 74	2 10	2 40	3 10	5 00	5 70	9 50	11 00	14 00

*Discount.....***Bushings.****Cast Iron.**

Reducing two or more sizes, up to $2\frac{1}{2}$ -inch, inclusive.
 Reducing one or more sizes, 3-inch and up.

Malleable.

Reducing one size only.

Fig. D. 374.

Size.....Inches.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Cast.....Ea.	04	04	05	06	07	09	14	21	30	40	50
Cast, Galv.....Ea.	08	08	10	12	14	18	28	42	60	80	1 00
Size.....Inches.	$4\frac{1}{2}$	5	6	7	8	9	10	12			
Cast.....Ea.	75	93	1 25	1 87	2 75	3 25	3 75	5 00			
Cast, Galv.....Ea.	1 50	1 85	2 50	3 75	5 50	6 50	7 50	10 00			
Size.....Inches.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$		
Mall.....Ea.	04	04	04	05	06	07	09	14	21		
Mall., Galv.....Ea.	08	08	08	10	12	14	18	28	42		

Discount.....**Lock Nuts.****Fig. D. 375.**

Size.....Inches.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Mall. ....Ea.	02	03	04	05	07	09	11	18
Mall., Galvanized Ea.	03	04	05	07	10	14	20	30

Size.....Inches.	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Cast.....Ea.	27	34	47	64	85	90
Cast, Galvanized.....Ea.	54	68	94	1 28	1 70	1 80

Size.....Inches.	6	7	8	9	10	12
Cast.....Ea.	1 30	1 70	2 35	2 70	3 00	4 00
Cast, Galvanized.....Ea.	2 60	3 40	4 70	5 40	6 00	8 00

Discount.....

PIPE FITTINGS.

Plugs,



Fig. D. 376.

Size.....Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$
Cast.....Ea.	02	02	02	02	03	04	05	07	10	18	25	38
Cast, Galv..Ea.	04	04	04	04	06	08	10	14	20	36	50	76
Size.....Inches	4	4 $\frac{1}{2}$	5	6	7	8	9	10	12			
Cast.....Ea.	42	65	88	1 20	1 85	2 75	3 25	3 75	5 00			
Cast, Galv..Ea.	84	130	1 75	2 40	3 70	5 50	6 50	7 50	10 00			

Discount.....

Unions.



Fig. D. 377.

Size.....Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$
Mall.....Ea.	18	18	20	22	27	33	46
Mall., Galvanized....Ea.	27	27	30	33	40	50	70
Size.....Inches	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	
Mall.....Ea.	58	75	1 55	2 10	3 65	4 35	
Mall., Galvanized....Ea.	90	1 15	2 35	3 15	5 50	6 50	

Discount.....



Couplings.



Fig. D. 378.

Right and Left.

Fig. D. 379.

Size.....Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Black.....Ea.	05	05	06	07	10	13	17	21	28	40	60
Galv.....Ea.	06	06	08	10	13	18	25	32	40	55	80
R. & L. Black.Ea.		07	08	11	15	20	25	30	50	85	1 20
Size.....Inches	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7	8	9	10	12	
Black.....Ea.	80	1 00	1 50	1 65	2 40	3 25	4 25	5 50	7 50	10 00	
Galv.....Ea.	1 05	1 40	2 00	2 25	3 25						
R. & L. Black.Ea.	1 60	2 00									

Discount.....



PIPE FITTINGS. Nipples.



Fig. D. 380.
Close.

Fig. D. 381.
Long.

Size..... Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
Close or short.....	04	04	04	05	06	08	11	13	18	39	48	75	85	1 25	1 55	1 85
Long.....	06	06	06	07	09	13	17	20	27	59	72	1 05	1 20	1 70	2 45	2 90

Discount.....

Flange Unions.

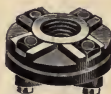


Fig. D. 382.

Cast Iron.

Faced—No Gasket.

Size..... Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$
Diameter of Flanges..... Inches	3	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5 $\frac{1}{2}$	6
Price..... Each	40	46	52	64	78	1 00	1 25
Price, Galvanized..... Each	80	92	1 04	1 28	1 56	2 00	2 50
Size..... Inches	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7
Diameter of Flanges..... Inches	6 $\frac{1}{2}$	6 $\frac{3}{4}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	12
Price..... Each	1 50	1 80	2 10	2 70	3 15	3 95	5 50
Price, Galvanized..... Each	3 00	3 60	4 20	5 40	6 30	7 90	11 00
Size..... Inches	8	9	10	12	14	15	16
Diameter of Flanges..... Inches	13 $\frac{1}{2}$	14 $\frac{1}{2}$	16	18 $\frac{1}{2}$	20 $\frac{1}{2}$	20 $\frac{3}{4}$	23
Price..... Each	7 00	10 00	11 50	16 00	28 00	35 00	60 00
Price, Galvanized..... Each	14 00	20 00	23 00	32 00	56 00	70 00	

Discount.....

Malleable Iron.

Faced—No Gasket.

Size..... Inches	$\frac{1}{2}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	3
Diameter of Flanges..... Inches	2 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$
Price..... Each	1 40	1 60	2 00	2 50	3 00	3 50	4 40
Price, Galvanized..... Each	2 80	3 20	4 00	5 00	6 00	7 00	8 80
Size..... Inches	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	8	
Diameter of Flanges..... Inches	7 $\frac{1}{2}$	8	8 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	13 $\frac{1}{2}$	
Price..... Each	5 25	6 00	7 00	8 00	9 00	18 00	
Price, Galvanized..... Each	10 50	12 00	14 00	16 00	18 00	36 00	

Discount.....

PIPE FITTINGS.



Fig. D. 383.

Return Bends.

Cast Iron—Close Pattern.



Fig. D. 384.

Size	Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price, Right Hand.....	Each	18	20	22	28	40	57	1 20	1 70
Price, Right and Left.....	Each	21	23	26	33	46	66	1 40	1 95
Price, Left Hand.....	Each	21	23	26	33	46	66	1 40	1 95
Price, Right Hand, Galv.Ea.		36	40	44	56	80	1 14	2 40	3 40
Center to Center.....	Inches	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$

Discount.....

Return Bends, Pitched.

Cast Iron—Close Pattern.

Suitable for Coils as per Table below.

Size.....	Inches	1	1	1	1	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
Length of Pipe in Coil...Feet		3	4	5	6	8	4	5	6
Price, Right Hand.....	Each	26	26	26	26	26	33	33	33
Price, Right and Left.....	Each	26	26	26	26	26	33	33	33

All Right and Left Pitched Return Bends are made to order.

One-inch Return Bends for coils longer than 8 feet are tapped straight.

Pitched Return Bends have length of coil marked on them.

Discount.....

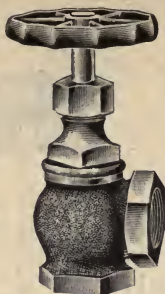
"Y" Bends.



Fig. D. 385.

Size.....	Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Cast.....	Each	20	28	34	54	66	94	1 66	2 50
Cast, Galvanized.....	Each	40	56	68	1 08	1 32	1 88	3 32	5 00
Size.....	Inches	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	10
Cast.....	Each	3 50	4 00	5 90	7 00	9 20	15 60	22 50	45 00
Cast, Galvanized.....	Each	7 00	8 00	11 80	14 00	18 40	31 20	45 00	90 00
Size.....	Inches	1	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4 "	
Mall.....	Each	60	80	1 00	1 70	2 00	4 00	5 50	
Mall, Galvanized.....	Each	90	1 25	1 50	2 50	3 00	6 00	8 25	

Discount.....



BRASS VALVES.



Fig. D. 386. Angle Valve, Screwed.

Fig. D. 387. Globe Valve Screwed.

Price, Each.

Size, Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Price, Globe	72c	72	77	1 00	1 26	1 80	2 52	3 50	5 30	10 00	14 40
" Angle	72c	72	77	1 00	1 26	1 80	2 52	3 50	5 30	10 00	14 40
" Cross		1 25	1 25	1 50	2 00	2 50	3 50	5 00	8 00	16 00	24 00

Discount



Check Valves.

Horizontal,
Vertical and Angle.

Fig. D. 388. Horizontal.

Fig. D. 389. Angle.

Price, Each.

Size, Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Horizontal	65c	65	70	90	1 15	1 60	2 25	3 15	4 75	9 00	13 00
Vertical		72	77	1 00	1 26	1 80	2 52	3 50	5 30	-----	-----
Angle	72c	72	77	1 00	1 26	1 80	2 52	3 50	5 30	10 00	14 40

Discount



STEAM COCKS.

Brass.

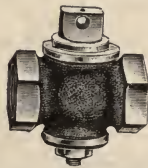


Fig. D. 390. Square Head.

Fig. D. 391. Flat Head.

Price, Each.

Size, Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Square Head	85c	85	1 00	1 25	1 70	2 35	3 70	4 85	7 30	14 50	22 50
Flat Head	85c	85	1 00	1 25	1 70	2 35	3 70	4 85	7 30	14 50	22 50
Tee Handle	85c	85	1 00	1 25	1 70	2 35	-----	-----	-----	-----	-----

Discount

IRON BODY BRASS MOUNTED GATE VALVES.

Price, Each.



Fig. D. 392.

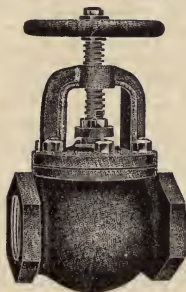
Size.....Inches	2	2½	3	3½	4	4½
Screwed Ends..	\$10 00	\$12 00	\$15 00	\$18 00	\$20 00	\$23 00
Flanged Ends..	10 00	12 00	15 00	18 00	20 00	23 00

Size.....Inches	5	6	7	8	10	12
Screwed Ends..	\$25 00	\$30 00	\$45 00	\$55 00	\$90 00	\$125 00
Flanged Ends..	25 00	30 00	45 00	55 00	90 00	125 00

Discount.....

IRON BODY GLOBE AND ANGLE VALVES.

Brass Trimmings.



Globe Valve, Yoke Top.

Fig. D. 393.

Size .....Inches	2	2½	3	3½	4	4½
Screwed.....Each	\$7 00	\$ 9 00	\$12 50	\$15 25	\$19 00	\$24 00
Flanged.....Each	8 60	10 75	15 00	18 50	22 50	27 50

Size.....Inches	5	6	7	8	10	12
Screwed.....Each	\$27 00	\$37 50	\$63 00	\$72 00	\$114 00	\$170 00
Flanged.....Each	31 00	42 00	68 00	77 00	123 00	187 00

Discount.....



Fig. D. 394.
Screwed Ends.
With Screwed Cover
and
Screwed Stuffing Box.
Style of sizes to 2 ins.

GATE VALVES.

Ludlow

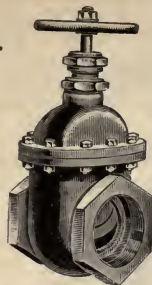


Fig. D. 395.
Screwed Ends.
With Bolted Cover and
Screwed Stuffing Box.
Style of sizes
2½ to 6 ins., inclusive.

Bronze Valves, Double Gate.

The internal mechanism of Valve consists of the stem, two gates and two bevel-faced wedges, the wedges being entirely independent of the gates (or discs) and working between them. By the action of the stem, which works through the nut in the upper wedge, the gates descend parallel with their seats until the lower wedge strikes the stop (or boss) in the bottom of case—the gates and upper wedge continuing their downward movement until the face or bevel of upper wedge comes in contact with face or bevel of lower wedge. The gates then being down opposite port or valve opening, the face of the upper wedge moves across the face of the lower wedge, bringing pressure to bear on the backs of both gates, from central bearings, thus forcing them apart and squarely against their seats.

In opening Valve, the first turn of the stem releases the upper wedge from contact with the lower wedge, thereby instantly releasing both gates (or discs) from their seats before they commence to rise.

There is less wear on the faces of gates and seats in opening and closing, as there is not the grinding which must necessarily follow in valves drawing one or both gates off their seats before obtaining relief.

Tested at 300 lbs. pressure per square inch, water pressure.

Price, Each.

Size, inches.....	¾	1	1½	2	2½	3	4	5	6	8
Screw Ends.....	\$1 40	\$1 40	\$1 80	\$2 35	\$3 40	\$4 40	.....	\$6 25	13 75	
Flanged Ends.....	.....	3 40	3 70	4 15	5 70	7 40	.....	11 00	18 75	
For Slide, Stem and Lever, add to list....	80	80	80	80	1 00	1 00	1 00	1 25	1 75	

Size, inches.....	3	3½	4	4½	5	6	7	8
Screwed Ends.....	\$15 50	23 50	34 00	45 00	52 00	76 00	.....	.....
Flanged Ends.....	21 50	30 50	43 00	55 00	64 00	88 00	120 00	158 00
For Slide, Stem and Lever, add to list....	2 00	2 00	2 00	2 25	2 25	2 25	.....	.....

Discount.....

GATE VALVES.

Ludlow.



Fig. D. 396.

Screwed Ends.

With Bronze Screwed Packing Box
and Follower Nut.
Style of sizes up to and including 6
inches.

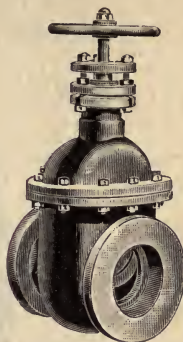


Fig. D. 397.

Flanged Ends.

With Bolted Packing Plate and
Follower.
Style of sizes above 6 inches.

Iron Body with Bronze Mountings.

Tested at 300 lbs. pressure per square inch, water pressure.

Price, each.

Sizes, Inches.	Screwed Ends.	Flanged Ends.	Hub or Bell Ends.	Spigot Ends.	For Slide Stem and Lever, add to List.	For Out- side Screw and Yoke, add to List.
2	\$ 7 00	\$ 7 50	\$ 7 00	\$ 7 25	\$1 25	\$ 8 50
2½	10 25	10 75	10 00	10 25	1 75	9 25
3	12 25	13 25	14 50	15 00	2 00	10 00
3½	16 50	17 50	16 00	16 50	2 00	11 00
4	18 00	18 50	17 00	17 50	2 00	12 00
4½	23 00	23 50	22 00	22 50	2 25	14 00
5	25 00	25 50	24 00	24 50	2 25	16 00
6	30 50	31 00	28 00	28 75	2 25	18 00
7	38 00	38 00	37 00	38 00	2 25	20 00
8	45 00	43 50	42 00	43 25	2 25	23 00
9	62 00	62 00	58 00	60 50	3 25	27 50
10	64 00	64 50	60 00	62 50	3 25	
12	82 50	80 00	76 00	79 50	4 00	

Discount.....

DOUBLE GATE VALVES.

Iron Body With Bronze Mountings.

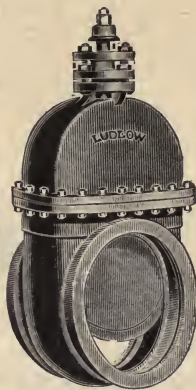


Fig. D. 398.

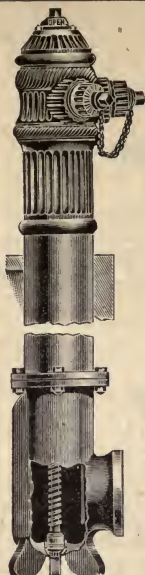
Tested at 300 lbs. Pressure per square inch, Water Pressure.

For Heavy Working Pressures Either Side of Gate.

Price, each.

Size, Inches.	Flanged Ends.	Hub or Bell End.	Spur Gearing, Add.	Bevel Gearing, Add.	For By Pass, Add.
14	\$ 130 00	\$ 122 00	\$ 26 00	\$ 28 00	\$33 00
15	148 00	138 00	26 00	28 00	36 50
16	153 00	143 00	26 00	28 00	36 50
18	215 00	205 00	16 00	18 00	49 00
20	254 00	242 00	16 00	18 00	49 00
22	325 00	315 00	20 00	24 50	49 00
24	390 00	375 00	20 00	24 50	49 00
28	625 00	600 00	70 00	95 00	49 00
30	690 00	650 00	70 00	95 00	70 50
36	1060 00	1020 00	90 00	125 00	76 00
40	1560 00	1520 00	90 00	125 00	77 50
42	1670 00	1630 00	90 00	125 00	77 50
48	2425 00	2375 00	1600 00	200 00	80 00

Discount.....



FIRE HYDRANTS.

Bronze Mounted.

Rubber Faced Gate.

Tested at 300 lbs. pressure per square inch, water pressure.

Cut shows bottom cut away, showing Gate open and Drip Valve, which is in the extreme bottom of Hydrant, closed.

Prices are based on a length of 5 feet from surface of ground to bottom of connecting pipe.

Fig. D. 399.

Diameter of Seat Ring or Valve Opening.	Inside Diameter of Stand Pipe or Hydrant Barrel.	Hub End Bottom Connection. Size of Pipe. Connecting Pipe.	One 2-inch Nozzle.	One 2½-inch Nozzle.	Two 2½-inch Nozzles.	Three 2½-inch Nozzles.	Four 2½-inch Nozzles.	For Each 6 Inches Increase or Decrease in Length, add or Deduct from List.
Inches.	Inches.	Inches.						
2	3	2	\$17 00					\$0 45
3	4	3 or 4		\$28 00				60
4	5	3 or 4		31 00	\$33 00			75
4	5	6		31 50	33 50			75
4½	6	6			35 50			80
5	7	6			40 50	\$37 50		85
6	8	6			50 00	42 50	\$44 50	1 00
6	8	8			51 25	52 00	54 00	1 00
8	10	8 or 10				53 25	55 25	2 25

Discount.....

PIPE TONGS.

Brown's Adjustable.

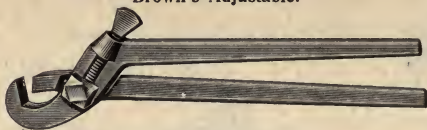


Fig. D. 400.

Nos.	1	1½	2	3	4	5	6	7
Takes Pipe from.....	½ to ¾	¾ to 1	1 to 1½	1 to 2	1½ to 3	2½ to 4	3 to 5	4 to 7
Price, each.....	60c	75c	85c	1 20	2 70	6 00	10 00	11 00

Discount.....

PIPE WRENCHES.

Alligator.



Fig. D. 401.

Nos.	0	1	1½	2	2½
Takes Pipe, inches.....	½ to ¾	¾ to 1	1 to 1½	1½ to 2	2 to 2½
Takes Round Iron.....	½ to 1	¾ to 1½	1 to 2	1½ to 2	2 to 2½
Length, inches.....	4	5½	5½	9	12½
Price, per doz.....	\$3 00	\$4 00	\$4 50	\$12 00	\$18 00

Nos.	3	3½	4	4½	5
Takes Pipe, inches.....	½ to 1½	¾ to 1½	1½ to 2	1½ to 2½	2 to 3
Takes Round Iron.....	½ to 1½	¾ to 1½	1½ to 2½	1½ to 3	2½ to 3½
Length, inches.....	15	18½	22	24	28
Price, per doz.....	\$24 00	\$30 00	\$36 00	\$50 00	\$60 00

Discount.....

Cochran.

Fig. 20. D. 4.

No.	Length, Open, Inches.	Takes Pipe, Inches.	Price, Each.	Hook Jaw, Each.	Inserted Jaws, Each.	Rocker, Each.	Nuts, Each.	Springs, Each.
1	10	½ to 1	\$2 25	\$0 75	\$0 33	\$0 28	\$0 28	\$0 14
2	14	¾ to 1½	3 00	1 00	50	40	35	17
3	18	1 to 2	4 00	1 33	55	50	42	21
4	24	1½ to 2½	6 00	2 00	72	65	55	25

Discount.....

PIPE WRENCHES.

Stillson's.



Fig. D. 403.

Length, Open, Inches.	Takes, Inches.	Price, Each.	Extra Frame, Each.	Extra Adjusting Nut, Each.	Extra Jaw, Each.	Extra Handles.		Extra Springs, Each.	Extra Pins.	
						Steel, Each.	Wood Grips, Each.		Frame, Each.	Spring Each.
* 6	to 1	\$2 00	\$0 35	\$0 15	\$0 75	\$0 95	\$0 16	\$0 10	\$0 03	\$0 01
* 8	to 1	2 00	35	15	75	95	16	10	03	01
* 10	to 1	2 25	40	20	80	1 10	18	10	04	02
* 14	to 1 1/2	3 00	50	20	1 00	1 45	25	10	04	02
18	to 2	4 00	55	22	1 33	2 10	.....	10	04	02
24	to 2 1/2	6 00	80	35	2 10	3 20	.....	11	04	02
36	to 3 1/2	12 00	1 30	55	4 75	6 40	.....	13	05	02
48	to 5	18 00	1 50	95	7 25	9 25	.....	13	05	02

*Complete Handles for these sizes consist of Steel Bar and Wood Grip and take price of both.

End Nuts for Wood Handles, 6 and 8 inch, list at 15 cents each; 10 and 14 inch, list at 20 cents each.

Discount.....

Trimo.



Fig. D. 404.

Length, Open, Ins.	Takes, Inches.	Price, Each.	Move- able Jaw, Each.	Nut, Each.	Inserted Jaw, Each.	Frame, Each.	Handle, Each.	Frame Pin, Jaw Pin, Each.	Springs, Each.
6	1 wire to 1 pipe	\$2 00	\$0 75	\$0 11	\$0 35	\$0 35	\$0 85	\$0 03	\$0 03
8	" " " "	2 00	75	11	35	35	85	03	03
10	" " " 1	2 25	80	14	45	40	95	04	03
14	" " " 1 1/2	3 00	1 00	17	55	50	1 25	04	03
18	" " " 2	4 00	1 33	22	65	55	1 70	04	04
24	" " " 2 1/2	6 00	2 10	35	75	80	3 00	04	04
36	pipe " 3 1/2	12 00	4 75	55	1 05	1 30	7 00	05	04
48	1 " " 5	18 00	7 25	95	1 35	1 50	10 50	05	04

Discount.....

PIPE WRENCHES.

Parmelee.



Fig. D. 405.

No. 2 1/2.

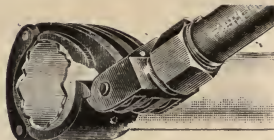


Fig. D. 405-1. Nos. 4 and 5.

This wrench has no teeth. It will make or break the tightest joint without marring or crushing the pipe or injuring the threads.

No.	Takes Pipe From	Size, Inches.	Wrenches, Complete.	Extra Stocks, Each.	Extra Girths, Each.
No. 1 Improved....	3/8 to 1 in.	10	\$5 00	\$2 25	3/8, 1/2, 3/4, 1 in., \$0 75
*No. 2 1/2 A "	1 in. only	20	4 00	3 00	1 in., 1 00
No. 2 1/2 "	3/4 to 2 in.	20	7 50	3 00	{ 3/4, 1, 1 1/4 in., 1 00
No. 4 "	2 to 3 in.	25	9 50	5 00	{ 1 1/2, 2 in., 1 25
No. 5 "	3 1/2 to 4 in.	.....	13 00	7 50	{ 2 1/2, 3 in., 1 50
					{ 3 1/2 in., 2 50
					{ 4 in., 3 00

*Especially adapted to signal work.

Discount.....

CHAIN PIPE WRENCHES.



Fig. D. 406.

With Round Link Chain.

Nos.....	2	3	4	5	6
Length of Lever.....feet	2 1/2	3	4	5	6
Takes Pipe from.....inches	1 to 2	1 1/2 to 4	2 to 6	2 1/2 to 8	4 to 10
Price.....each	\$5 50	\$6 25	\$9 00	\$12 50	\$16 00

Discount.....

Brocks.

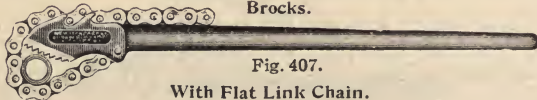


Fig. 407.

With Flat Link Chain.

No.	Holds Pipe, Inches.	Length, Inches.	Weight, Pounds.	Price, Each.	Extra Chains, Each.	Extra Jaws, per Pair.
10	1/4 to 1	13	1 1/2	\$ 2 50	\$0 75	\$1 00
11	1/4 to 2	20	5	3 50	1 00	1 75
12	1/4 to 3	27	8	5 00	1 50	2 75
13	1/4 to 6	37	16	7 00	2 50	4 00
13 1/2	1 to 8	44	21	9 00	3 50	4 50
14	1 1/2 to 10	50	28	11 00	4 00	5 00
15	2 to 14	64	45	18 00	6 00	6 00

Discount.....

PIPE WRENCHES.

"VULCAN BIJAW."

Double-ended Reversible Jaws.

Cable or Flat Link Chain.

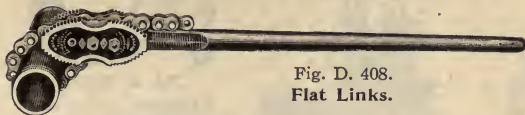


Fig. D. 408.

Flat Links.

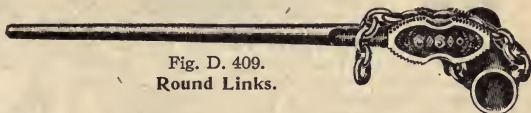


Fig. D. 409.

Round Links.

These wrenches have *reversible jaws*. These may be quickly and easily changed end for end as the teeth first in use wear, thus doubling the life of the jaws—a unique feature, the value of which is readily apparent.

The reversible jaws, being firmly fastened to the handle by two studs or bolts, as shown by the cut, cannot spread in use.

When ordering, state which chain is desired: *Flat Link Chain will be sent unless otherwise specified.*

Number	30	31	32	33	33½	34	35
Capacity Size Pipe..	½ to ¾ in.	¾ to 1½ in.	1 to 2½ in.	1½ to 4 in.	1 to 6 in.	1½ to 8 in.	2 to 12 in.
Price, each with Flat Link Chain.....	\$2 50	\$3 50	\$5 00	\$7 00	\$9 00	\$11 00	\$18 00
Price, each with Cable Chain.....	\$2 50	\$3 50	\$5 00	\$7 00	\$9 00	\$11 00	\$18 00
Extreme length.....	13½ in.	20 in.	27 in.	37 in.	44½ in.	50½ in.	64½ in.
Weight.....	1½ lbs.	5½ lbs.	10 lbs.	16 lbs.	24 lbs.	31 lbs.	50 lbs.
Extra Jaws, Pair....	\$1 00	\$1 75	\$2 75	\$4 00	\$4 75	\$5 50	\$7 50
Extra Flat Link Chain, each.....	\$ 75	\$1 00	\$1 50	\$2 50	\$3 25	\$4 00	\$6 00
Length.....	9½ in.	13½ in.	17½ in.	22½ in.	31 in.	39 in.	54½ in.
Breaking Strain, Pounds.....	3,600	6,700	9,800	12,500	14,300	15,700	21,800
Extra Cable Chain, each.....	\$0 75	\$1 00	\$1 50	\$2 50	\$3 25	\$4 00	\$6 00
Length.....	9½ in.	14½ in.	18 in.	27 in.	33½ in.	42 in.	57 in.
Size Iron.....	7⁄8 in.	¾ in.	1½ in.	1 in.	1½ in.	1½ in.	1½ in.
Breaking Strain, Pounds.....	1,200	4,000	6,000	10,500	12,500	15,000	19,000

Discount.....

PIPE WRENCHES.

"Ideal"

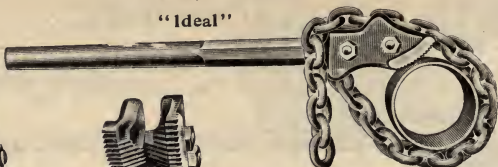
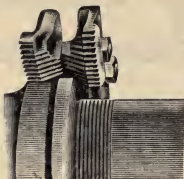


Fig. D. 409 A.

Furnished with Cable
or Flat Link Chain,
as desired.

Note how easily it grips a Flange or Beaded Fitting.

The jaws have two kinds of biting surfaces: Regular Jaws for all straight surfaces, such as pipe, etc.; V shaped jaws (inside biting surface) for fittings, valves, flanges or castings of every description; grips all surfaces at two points, **no one sided gripping.**

Quick adjustment. All slack of chain taken up between chain support and front of jaws. Radius of biting surface enables operator to obtain many more grips than with other wrenches.

Perfect chain lock; never binds. Holds chain firmly.

Quick Repairs. Simply remove loose steel pin, discard broken links and re-attach rest of chain. **A great time saver.** All parts interchangeable.

Jaws, drop forged of high grade tool steel, easily tempered and sharpened when necessary.

Can be fitted to any discarded wrench handle or bar. Jaw reinforced over handle; no strain on bolts.

Chain, of Norway iron (will stretch before breaking), held by loose steel pin.

Handle, extra heavy (round steel), **very stiff.**

Strength and durability combined with lightness, easy to handle, and fully guaranteed.

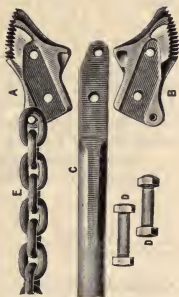


Fig. D. 409 B.

Number of wrench.....	2	3	4	5
Capacity size pipe.....	$\frac{1}{2}$ to $3\frac{1}{2}$	1 to 5	2 to 8	$2\frac{1}{2}$ to 12
Capacity size fittings.....	$\frac{1}{2}$ to 3	1 to 4	2 to 6	$2\frac{1}{2}$ to 10
Length of wrench.....	27	38	49	61
Weight of wrench.....	10 lbs.	18 lbs.	28 lbs.	50 lbs.
Size and length cable chain.....	$\frac{3}{16}$ x20	$\frac{1}{4}$ x30	$\frac{1}{4}$ x35	$\frac{1}{4}$ x50
Size and length flat link chain.....	$\frac{1}{8}$ x23	$\frac{1}{8}$ x30	$\frac{1}{8}$ x37	$\frac{1}{8}$ x53
Wrench with cable chain.....	\$6 00	\$8 00	\$11 00	\$16 00
Jaws complete with bolts and pins.....	3 50	5 00	6 50	8 25
Jaws, right or left, each.....	1 63	2 25	2 93	3 75
Bolts, each.....	20	25	30	35
Pins (Vanadium steel), each.....	15	20	25	30
Cable chain (Norway iron).....	95	1 20	1 70	3 00
Flat link chain.....	2 00	3 00	4 00	6 00
Wrench with flat link chain.....	6 90	9 20	12 65	18 40
Handle, each.....	2 10	3 25	4 75	6 90

Wrenches with cable chain furnished, unless otherwise specified.

Discount.....

“DAYTON” SELF-ADJUSTABLE CAR WRENCH.

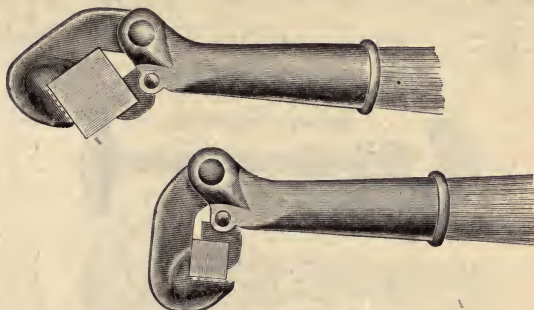


Fig. D. 409C

Is designed for use in dumping and winding up the dumps of hopper and drop bottom coal cars.

It fits all winding taps, is self-adjusting without adjustments, and has second growth Ash handle, 2½ inches at swell, giving 40 inches of winding leverage.

The jaws are so arranged that the harder the pull, the tighter it grips, but loose jaw will immediately release when tendency of winding tap is to revolve toward operator as in dumping a car.

Price, each.....\$5 00

Discount.....

PIPE CUTTERS.

Saunders'

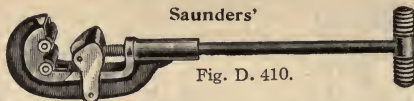


Fig. D. 410.

Number.....	1	2	3	4	5
Cuts Pipe from.....	$\frac{1}{2}$ to 1	1 to 2	2 to 3	$2\frac{1}{2}$ to 4	4 to 6
Price, complete.....each	\$3 00	\$4 50	\$11 00	\$18 00	\$28 00
" Extra Block and Wheel....."	1 25	1 75	2 75	3 50	4 00
" " Wheels....."	24	32	60	60	60
" " Hooks....."	1 75	2 60	4 55	9 50	13 75
" " Rollers....."	24	32	50	50	60
" " Pins....."	10	10	15	15	15

Discount.....

Bornes' Three Wheel



Fig. D. 411.

Size of Cutter.	Size of Pipe.	Pipe Cutter.	Cutter Wheels.	Wheel Pins Per Dozen.	Hooks.	Slides.	Nuts.	Handles.	Approximate Weights.
No. 1	$\frac{1}{2}$ to 1 inch.	\$ 4 50	\$0 25	\$1 00	\$ 1 75	\$ 0 75	\$0 25	\$ 1 00	3 lbs.
No. 2	$\frac{1}{2}$ to 2 inch.	6 00	30	1 00	2 60	1 00	25	1 25	5 lbs.
No. 3	$1\frac{1}{2}$ to 3 inch.	10 00	40	1 00	4 55	2 00	*	2 25	9 lbs.
No. 4	$2\frac{1}{2}$ to 4 inch.	20 00	50	2 00	9 50	4 50	*	4 50	14 lbs.
No. 5	4 to 6 inch.	30 00	75	2 00	13 75	7 00	*	7 00	23 lbs.
No. 6	6 to 8 inch.	40 00	75	2 00	20 00	8 50	*	9 25	28 lbs.
No. 6 $\frac{1}{2}$	8 to 10 inch.	45 00	75	2 00	23 00	9 50	*	10 25	34 lbs.
No. 7	9 to 12 inch.	50 00	75	2 00	25 00	11 25	*	11 50	51 lbs.

*Nut and Hook in one piece in these sizes.

Discount.....

Trimo.



Fig D. 412.

No.	Cuts Pipe From	Price, complete Each.	Extra Cutter Wheels.	Extra Frames.	Extra Blocks.	Extra Rolls.	Extra Nuts.	Extra Handle Screws.	Extra Handles.
1	$\frac{1}{2}$ to $1\frac{1}{2}$	\$4 50	\$0 30	\$2 25	\$1 25	\$0 30	\$0 35	\$1 00	\$0 35
2	$\frac{1}{2}$ to 2	6 00	30	2 50	1 25	30	35	1 25	35
3	$1\frac{1}{2}$ to 3	10 00	40	3 25	2 25	40	40	2 00	35

Extra Washers, each, \$0 05.

Extra Pins with Cutters, each, \$0 10.

Discount.....

PIPE CUTTERS.

Stanwood.



Fig. D. 413.

Number.....	1	2	3
Cuts Pipe from (inches).....	$\frac{1}{4}$ to 1	$\frac{1}{4}$ to 2	$1\frac{1}{4}$ to 3
Price, complete.....each	\$1 50	\$2 25	\$7 00
" Wheels....."	12	18	25
" Blocks and Wheels....."	45	60	1 25
" Pins....."	05	05	10

Discount.....

Vosper.

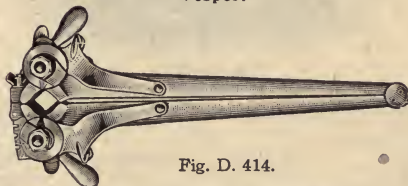


Fig. D. 414.

Capacity $\frac{1}{4}$ -inch to 2-inch Pipe.

The "Vosper" Cutter differs in every particular from previously existing pipe-cutting tools. The main frame of the tool consists of two arms hinged at the handle end and terminating at the other end in V-shaped bearings. The frame opens on its hinge and is put on the pipe and clamped there by means of an adjustable tie-bar and thumb-nut. Pivoted to the side of the main frame are two knife-carrying arms, an integral part of which are overhanging lugs to which are fastened heavy coil springs which actuate the feed of these knife-carrying arms. Heavy steel studs projecting through the ends of these knife-carrying bars hold the knives (which are circular in shape with a segment cut out to provide the cutting edge) and the steel "shoe" that rides ahead of each knife to regulate the depth of the cut. Eccentric levers pivoted on the knife-carrying arms in the proper place enable the operator to overcome the spring-tension and draw the knife-carrying arms back so the knives (or cutters) will clear the pipe when putting the tool on same. After the tool is fastened in the desired position on the pipe, the eccentric levers are turned over, allowing the knives (or cutters) to rest on the pipe; the tool is then rotated and the springs automatically feed the cutters until the pipe is cut off. This cut will be found to be perfectly true and at right angles with the length of the pipe. There will be no burr on the outside edge, and only the ragged tissue edge in one or two spots, where the pipe breaks off, on the inside. The operator will be surprised at the speed with which the tool does its work. The cutters may be successively reground around three-fourths of their periphery, thus making the expense of renewal for these parts trivial.

Price, each.....\$16 00

Discount.....

PIPE CUTTING MACHINES.

Forbes Hand Machines.

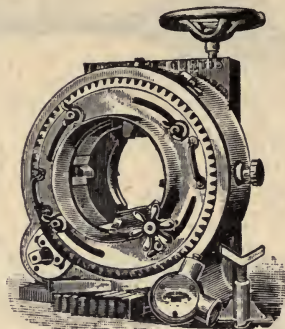


Fig. D. 415.

No.	Range.	Approx. Net Weight, Pounds.	Price.
*30	$\frac{1}{2}$ to 2 inches, both right and left	140	\$ 50 00
*32	$\frac{1}{2}$ to 2 " for solid dies (without dies)	138	45 00
*34	1 to 3 " right hand, 1 to 2 inches left hand ..	175	75 00
*36	$\frac{3}{4}$ to 3 " " $\frac{3}{4}$ to 2 " "	178	85 00
*37	$\frac{1}{2}$ to 3 " " and left	180	105 00
*38	$1\frac{1}{2}$ to 4 " " hand	238	100 00
*40	$1\frac{1}{2}$ to 4 " " and left	253	115 00
*42	1 to 4 " " hand	247	110 00
*44	1 to 4 " " and left	260	130 00
†46	$2\frac{1}{2}$ to 4 " " hand	237	85 00
†50	4 to 6 " " "	330	115 00
†52	$3\frac{1}{2}$ to 6 " " "	335	130 00
†54	$2\frac{1}{2}$ to 5 " " "	338	150 00
†56	$2\frac{1}{2}$ to 6 " " "	344	175 00
†62	$2\frac{1}{2}$ to 6 " " (extra heavy)	790	300 00
*58	1 to 6 " " "	364	190 00
*60	1 to 6 " " and left	387	235 00
*63	$2\frac{1}{2}$ to 8 " " "	636	360 00
†64	$2\frac{1}{2}$ to 8 " " hand	648	325 00
†66	$2\frac{1}{2}$ to 10 " " "	964	500 00
*67	$2\frac{1}{2}$ to 10 " " "	970	500 00
*68	$2\frac{1}{2}$ to 10 " " and left	1000	550 00

* Pressure feed machine. † Lead screw machine.
Nos. 30 to 37 have no cut-off attachment.

PIPE CUTTING MACHINES.

Forbes Hand or Power.

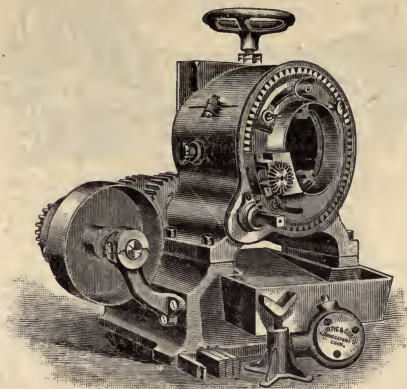


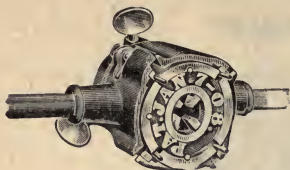
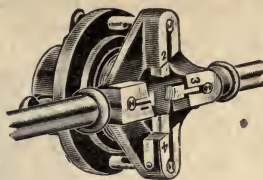
Fig. D. 416.

No.	Range.	Approx. Net Weight, Pounds.	Price.
* 70	$\frac{1}{4}$ to 2 inches, right and left.....	357	\$100 00
* 72	$\frac{1}{4}$ to 2 " for solid dies (without dies).....	332	95 00
* 74	1 to 3 " right hand, 1 to 2 inches left hand ..	401	125 00
* 76	$\frac{3}{4}$ to 3 " " " $\frac{3}{4}$ to 2 " " " ..	390	135 00
* 77	$\frac{1}{4}$ to 3 " " and left.....	390	155 00
† 78	$2\frac{1}{2}$ to 4 " " hand.....	552	140 00
* 80	$1\frac{1}{2}$ to 4 " " " ..	544	150 00
* 82	$1\frac{1}{2}$ to 4 " " and left.....	565	165 00
* 84	1 to 4 " " hand.....	562	160 00
* 86	1 to 4 " " and left.....	548	180 00
† 88	$\frac{1}{2}$ to 6 " " hand.....	658	170 00
† 90	$3\frac{1}{2}$ to 6 " " " ..	702	180 00
† 92	$2\frac{1}{2}$ to 5 " " " ..	710	200 00
† 94	$2\frac{1}{2}$ to 6 " " " ..	703	225 00
* 96	1 to 6 " " " ..	789	250 00
* 98	1 to 6 " " and left.....	768	285 00
* 99	$2\frac{1}{2}$ to 8 " " " ..	1289	535 00
† 100	$2\frac{1}{2}$ to 8 " " hand.....	1295	500 00
† 102	$2\frac{1}{2}$ to 10 " " " ..	1971	700 00
* 104	$2\frac{1}{2}$ to 10 " " " ..	2218	700 00
* 106	$2\frac{1}{2}$ to 10 " " and left.....	2050	750 00

* Pressure feed machine. † Lead screw machine.

These prices include counter-shaft, ratchet wrench and pipe rest.
Nos. 70 to 77 have no cut-off attachment.

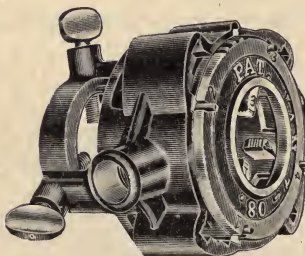
TOLEDO PIPE THREADING DEVICES.

Fig. D. 417.
No. 0.Fig. D. 418.
No. 1.

Model Number.	Threads Pipe, Inches.	Price, Each.	Extra Dies.			
			Sets in Complete Set.	Segments in Single Set.	Price, Complete Set.	Price, Single Set.
0	$\frac{1}{8}$ to $\frac{3}{4}$	\$16 00	3	4	\$ 7 50	\$2 50
1	1 to 2	24 00	4	4	10 00	2 50
*1A	1 to 2	30 00	4	4	10 00	2 50

*Ratchet.

Discount.....

Fig. D. 419.
No. 10.

Model Number.	Threads Pipe, Inches.	Price, Each.
10.....	1 to 2	\$28 00
10A.....	1 to 2	34 00

Models Nos. 10 and 10A utilize one set of dies for threading four sizes of pipe.
 Price, per set of four segments.....\$2 75

Discount.....

TOLEDO PIPE THREADING DEVICES.

Geared Adjustable.

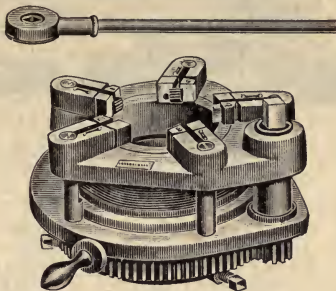


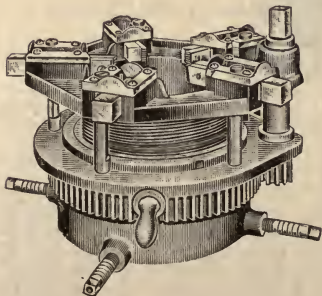
Fig. D. 420.

No. 3.

This tool will enable ONE man to easily and quickly thread any size pipe up to and including twelve inches.

Model Number.	Threads Pipe, inches.	Price, each.	EXTRA DIES			
			Sets in Complete Set.	Segments in Single Set.	Price, Complete Set.	Price, Single Set.
2	2½ to 4	\$100 00	4	5	\$32 00	\$ 8 00
25	2½ to 6	230 00	1	5	8 00	8 00
3	4½ to 8	300 00	5	5	60 00	12 00
4	9 to 12	500 00	3	5	60 00	20 00

Discount.....

Fig. D. 421
No. 25.

This model differs from other "Toledo" geared tools in that it is constructed to utilize but one set of dies for threading the entire range of sizes (seven). The adjustment of the dies is not accomplished by the use of a cam-plate, and the weakness of that form of construction has therefore been eliminated. Two sets of dies are furnished with this model so that when one set is dull and needs grinding, another set will be on hand to take its place.

Capacity, 2½-inch to 6-inch pipe, inclusive.

Complete with dies, ratchet and driving cross. Price.....\$230 00

Discount.....

PIPE STOCKS.

Solid Dies,



Fig. D. 422.

No.	0	1	1½	1¾	2	3	3½
Cuts, Inches, incl.....	½ to ½	½ to 1	¾ to 1½	1 to 1½	1½ to 2	2½ and 3	2½ and 3
Dimensions.....	2 x ½	2½ x ½	3 x ¾	3 x ¾	3½ x ¾	4½ x 1½	4½ x 1½
Complete.....	\$9 50	\$15 00	\$13 50	\$13 50	\$20 00	\$43 00	\$51 00
Stock Only.....	3 50	5 00	6 00	6 00	9 50	25 00	33 00
Extra Dies.....	1 50	2 00	2 50	2 50	3 50	9 00	9 00
Extra Bushings.....	25	35	45	45	60	1 00	1 00
Die Frames.....		30	40	40	50	60	60

Stock Nos. 2, 3 and 3½ have Leader Screw Attachment.

Discount.....

Nye.

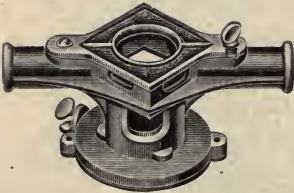


Fig. D. 423.

No. 1, size of block, 2½ inches square by ¾. List.....each, \$ 9 00
No. 2, size of block, 4 inches square by ¾. List.....each, 12 00

Size Block 2½x2½x¾ for No. 1 Stock.		Size Block 4x4x¾ for No. 2 Stock.	
Price Blocks, each.		Price Blocks, each.	
1 inch.....	\$3 50	2 inch.....	\$5 00
¾ inch.....	3 00	1½ inch.....	5 00
¾ inch.....	3 00	1½ inch.....	4 50
¾ inch.....	2 50	1 inch.....	4 50
¾ inch.....	2 50	¾ inch.....	4 00
¾ inch.....	2 00	¾ inch.....	4 00

Discount.....

ARMSTRONG'S ADJUSTABLE PIPE STOCK.

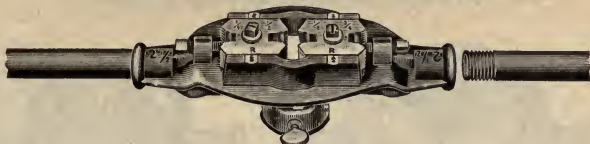


Fig. D. 424.

No.	Cuts, Inclusive.	Price.				
		Complete, R. H.	Complete, R. & L. H.	Stock Only.	Extra Dies.	Extra Bushings
1	$\frac{1}{8}$ to $\frac{1}{2}$	\$ 9 00	\$14 00	\$ 3 25	\$ 1 25	\$0 20
2	$\frac{1}{4}$ " 1	12 00	20 00	4 00	1 50	25
2	$\frac{1}{2}$ " 1	14 00	23 00			
2 $\frac{1}{2}$	$\frac{3}{4}$ " 1 $\frac{1}{2}$	12 00	18 00	4 50	3 25	40
3	1 $\frac{1}{4}$ " 2	20 00	32 00	7 00	4 00	50
3	1 " 2	24 00	40 00			
3	$\frac{3}{4}$ " 2	28 50	48 50			
6	2 $\frac{1}{2}$ " 3	40 00	55 00	25 00	15 00	1 00
7	2 $\frac{1}{2}$ " 4	60 00	92 00	30 00	16 00	1 50
7	2 $\frac{1}{2}$ " 3	45 00	60 00			
7	3 $\frac{1}{2}$ " 4	45 00	60 00			

Discount.....

PIPE TAPS AND REAMERS.



Fig. D. 425.



Fig. D. 426.

Size..Inches,	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Taps...each	\$1 12	1 25	1 50	1 87	2 50	3 12	3 75	4 62	6 25	10 50	15 00
Reamers.. "	1 12	1 25	1 50	1 87	2 50	3 12	3 75	4 62	6 25	10 50	15 00

Discount.....

ADJUSTABLE TAP AND REAMER WRENCHES.



Fig. D. 427.

Size	Capacity (Tap Sizes).		Full Length, Inches.	Price Each.	Size	Capacity (Tap Sizes).		Full Length, Inches.	Price, Each.
	Hand.	Pipe.				Hand.	Pipe.		
00	$\frac{3}{8}$ and smaller	.	5	\$ 1 25	7 $\frac{1}{2}$	$\frac{3}{8}$ —1 $\frac{1}{4}$	$\frac{1}{4}$ — $\frac{3}{4}$	30	\$ 6 50
0	$\frac{1}{16}$ — $\frac{1}{4}$		7	1 50	8	$\frac{3}{4}$ —1 $\frac{1}{2}$	$\frac{1}{4}$ —1 $\frac{1}{4}$	42	8 00
4	$\frac{1}{16}$ — $\frac{7}{8}$		9	1 75	20	$\frac{1}{16}$ —1 $\frac{1}{2}$	$\frac{1}{4}$ —1	42	7 00
5	$\frac{1}{16}$ — $\frac{1}{2}$		11	2 00	22	$\frac{1}{16}$ —2 $\frac{5}{8}$	1—2	56	15 00
6	$\frac{1}{4}$ — $\frac{3}{4}$	$\frac{1}{8}$ — $\frac{3}{8}$	15	2 50	24	1 $\frac{3}{4}$ over	2—4	72	25 00
7	$\frac{3}{8}$ —1	$\frac{1}{8}$ — $\frac{3}{4}$	20	3 50					

Discount.....

OSTER ADJUSTABLE PIPE STOCK.
"Bull Dog"

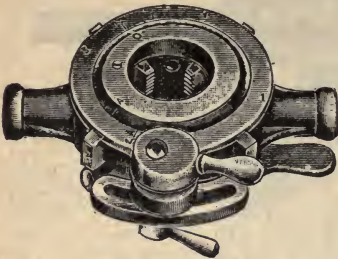


Fig. D. 428.
Nos. 101 to 104.
Plain Stock.

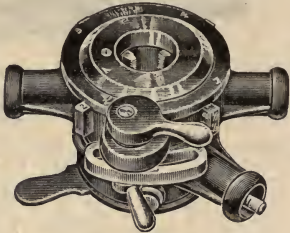


Fig. D. 429.
Nos. 102R to 105R.
Ratchet Stock.

The new lever-controlled setting device, provides instant and easy release of the dies without backing off. One movement of the lever opens or closes the dies. Duplicate threads can be made without resetting the dies.

Threads Pipe, Inches.	Sets of Dies.	Plain Stocks.			Ratchet Stocks.		
		No.	Price Complete	Extra Dies, per set. (4 pcs.)	No.	Price Complete	Extra Dies, per set. (4 pcs.)
1, 1 & 3/4; 1 & 1/2.....	3	101	\$13 00	\$1 50	.....	.....	.....
1 & 3/4; 1 & 1/2; 1 & 1/4.....	3	102	17 00	1 75	102R	\$20 00	\$1 75
1 & 1/2; 1 & 1/4; 2.....	2	103	22 00	2 00	103R	27 00	2 00
1 & 1/4; 1 & 1/2; 1 & 1/4; 2.....	3	104	25 00	2 00	104R	30 00	2 00
1 & 3/4; 1 & 1/2; 1 & 1/4; 1 & 1/4; 2.....	4	104 1/2	28 00	2 00	.....	.....	.....
1 & 2; 2 & 3/4; 3.....	2	105	40 00	3 00	105R	50 00	3 00
2 & 3; 3 & 4.....	2	106	55 00	3 50	106R	70 00	3 50

1/4-inch pipe dies may be added to range of No. 102 at the cost of one extra set of dies.

These Stocks are not made with cut-off attachment.

Discount.....

OSTER GEARED DIE STOCKS.
With Adjustable Centering Chuck.



Fig. D. 430.
(Reduced Cut.)

No.	Dimen- sions, Inches.	Weight with Tripod, Net, Gross.		Price with Bench Brackets.	Price with Bench Brackets and Pan.	Price Com- plete with Tripod.
16	20x24x35	190	275	\$110 00	\$115 00	\$125 00
17	18x22x32	275	500	185 00	190 00	200 00

List price on No. 16 includes one set of dies threading 2 1/2, 3, 3 1/2 and 4 inch pipe.

List price on No. 17 includes four sets of dies threading 2 1/2, 3, 3 1/2, 4, 4 1/2, 5 and 6 inch pipe.

Discount.....

POWER PIPE MACHINES.

Oster.



Fig. D. 431.
Belt Driven.

A strong, powerful machine built on a good, wide base, and is intended for the hardest kind of work. The Oster Patent Lever Controlled Die Head provides instant and easy release of dies. The lever can be operated while the machine is in motion; no burr is left in the thread. The Adjustable Guides hold the pipe firmly while cutting off. No change of equipment necessary. The Automatic Oiling Device keeps the dies flooded with a liberal quantity of oil at all times. The vise is simple and practical. It centers the pipe perfectly, insuring straight threads.

No. 207A.—Price complete with counter shaft, oil pump, automatic cut-off and pipe rest stand.....\$425 00

Price on Motor Machines for direct or alternating current, upon application.

Discount.....

PIPE AND NIPPLE MACHINE.

Oster.

The capacity of these machines for miscellaneous threading, such as nipples, bolts, short bends, as well as regular pipe work, is unlimited.

They are equipped with the Oster Patent Lever Controlled Die Head. The dies are all of standard length, and any single die of the set can be replaced. The vise is in front of the operator. The work is dropped into it from the top; a very convenient arrangement, and making it possible to change quickly. The operation is in plain sight. The vise travels on the bed of the machine right up to the front of the die head, so that short pieces can be handled.

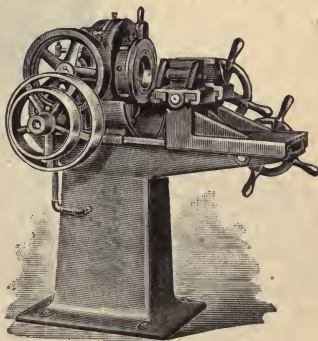


Fig. D. 432.
Belt Driven.

Number.	Range of Sizes.	Set of Dies.	List Price.	Extra Dies List.	Shipping Weights.
300A	$\frac{1}{4}$ to 2 inch pipe.....	4	\$200 00	\$3 00	800 lbs.
304A	1 to 4 inch pipe.....	4	300 00	4 00	1400 lbs.
306A	$1\frac{1}{4}$ to 6 inch pipe.....	6	425 00	5 00	2240 lbs.
207A	1 to 6 inch pipe.....	6	425 00	5 00	1950 lbs.

Discount.....

Price on Motor Machines for direct or alternating current upon application.

PIPE DRILLING MACHINE.

Mueller.

Fig. D. 434.
No. 20.

For Drilling Water Mains and High Pressure Gas Mains Under Pressure.

With suitable tools and stuffing nut nipples, this machine will drill holes from $\frac{1}{8}$ to 1 inch size in any size of pipe under pressure. Standard equipment includes ratchet handle complete, drift pin for removing drills from drill holders, boring bar complete, body stuffing box complete and combined feed nut and yoke, but no drills, drill holders nor body stuffing box nipples. Full instructions sent with each machine. Shipping weight about 26 pounds.

PRICE LIST.

Each.

No. 20, with standard equipment.....	\$18 50
Drills, size $\frac{1}{8}$ ".....	90
" " $\frac{1}{4}$ ".....	1 30
" " $\frac{1}{2}$ " and $\frac{3}{4}$ ".....	1 50
" " $\frac{1}{2}$ " and 1".....	1 75
Drill Holders, size $\frac{1}{8}$ ".....	3 25
" " $\frac{1}{4}$ ".....	3 50
" " $\frac{1}{2}$ ".....	3 75
" " 1".....	4 00
Stuffing Box Nipples, with outside thread, $\frac{1}{8}$ ", $\frac{1}{4}$ ", 1" and 1 $\frac{1}{2}$ "....	1 25
" " " " inside " $\frac{1}{8}$ ", $\frac{1}{4}$ ", 1" and 1 $\frac{1}{2}$ ".....	1 25

Discount.....

PIPE VISES.

"Vulcan" Chain Pipe Vise.

For Holding Pipe, Bolts, Bars, Shafts, etc.
From $\frac{1}{4}$ to 4 inches diameter.

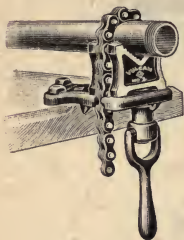


Fig. D. 435.

This vise is unbreakable, compact, rapid in action and positive in gripping pipe. It especially replaces the bulky, heavier tools commonly used for service away from work shops; it is small enough to carry in hand or tool bag, and is equally serviceable on bench or post. Adjustment is quickly effected by slightly turning the screw, and further quick adjustment is gained by engaging the projecting rivets of chain with a series of bosses on base.

It is made entirely of wrought steel. The drop-forged jaws are of saw-temper for file-sharpening. The hand-made chains are of same quality as those of our Vulcan Chain Pipe Wrenches, and all parts are fully guaranteed and interchangeable.

Orders for Chains take Screw also.

Orders for Handles or Nuts take both pieces assembled.

No.	For Pipe, Sizes.	Price, Each.	Prices, extra parts						
			Weight.	Jaws.	Chain, with Screw.	Handle and Nut.	Screw.	Washer.	Nut.
1	$\frac{1}{4}$ to 2	\$ 3 50	4 lbs.	\$1 20	\$1 10	\$0 75	\$0 20	\$0 15	\$0 45
2	$\frac{1}{4}$ to 4	6 50	10 "	2 75	1 75	1 50	35	25	90
4	$\frac{1}{4}$ to 8	18 00	30 "	7 50	4 75	2 00	70	45	1 20

Discount.....

"Toledo" Malleable Vises.



Fig. D. 436.

Holding Elbow.



Fig. D. 437.

Holding 2½ inch Pipe.

These vises embody entirely new principles. Strength of the grip of ordinary three-jaw vises is limited to the width of the top jaw, which is usually not more than a half-inch. The grip of the No. 1 vise jaws is 1½ inches wide and of the No. 2, 2½ inches wide. They will not crush pipe nor mar pipe with polished surface, and will grip absolutely tight with half the screw pressure necessary in using the ordinary vise.

No. 1, capacity $\frac{1}{4}$ to 2½ inches, each.....\$10 00

No. 2, capacity $\frac{1}{4}$ to 4½ inches, each..... 20.00

Discount.....

PIPE VISES.

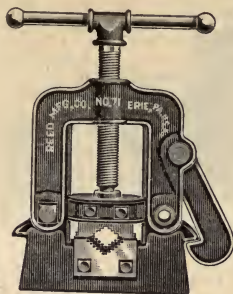


Fig. D. 433.
Front View.

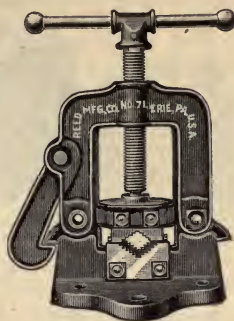


Fig. D. 439.
Back View.

Nos.....	1	2	3	4
Holds Pipe from, inches.....	$\frac{1}{8}$ to $2\frac{1}{2}$	$\frac{1}{8}$ to $3\frac{1}{2}$	$\frac{1}{8}$ to $4\frac{1}{2}$	$\frac{1}{8}$ to 6
Price, each.....	\$10 00	\$14 00	\$20 00	\$30 00

Discount.....



Fig. D. 440.

Armstrong's Hinged Vise.

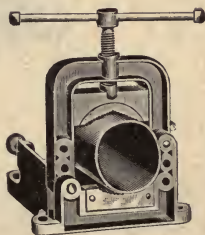


Fig. D. 441.

Saunder's Adjustable Vise.

	Price.
No. 1 holds from 0 to $2\frac{1}{2}$ in. pipe.	\$10 00
No. 2 " " $\frac{3}{4}$ to $4\frac{1}{2}$ " "	20 00
No. 3 holds from $\frac{1}{8}$ to 4 in. pipe.	\$24 00
No. 4 " " 2 to 6 " "	30 00
No. 5 " " $2\frac{1}{2}$ to 8 " "	45 00
No. 6 " " 4 to 12 " "	70 00

Discount.....

PARKER'S COMBINATION PIPE VISES.
Stationary Base.



Fig. D. 442.

No.	Weight, Lbs.	Holds' Pipe.	Length of Jaw, Inches.	Price, Each.
88½	94	To 4 in. inclusive.	4½	\$28 00
89½	141	To 6 in. inclusive.	5½	35 00

The steel faces of these Vises are milled and fitted to the Jaws and are renewable.

Discount.....

Swivel Bottom.

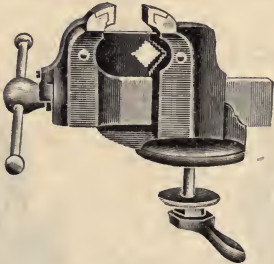


Fig. D. 443.

No.	Weight, Lbs.	Jaw, Inches.	Vise Opens.	Holds Pipe, Inches.	Price, Each.	Repair Parts		
						Slide.	Back Jaw.	Screw.
87	41	3	4½	2	\$16 00	\$2 00	\$3 00	\$1 00
88	59	4	6	3	20 00	2 50	3 50	1 50
288½	105	4	6½	4	28 00	4 50	5 50	2 50
289½	155	5	9½	6	35 00	5 00	6 50	3 00

Discount.....

PRENTISS COMBINATION PIPE VISES.

"Blake."

Swivel Base.

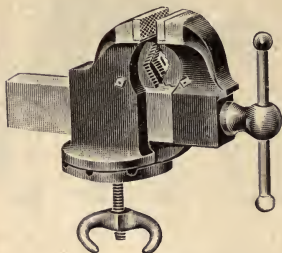


Fig. D. 444.

Nos. 181, 182 and 182½.

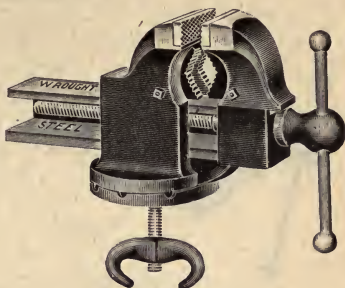


Fig. D. 445.

Nos. 183 and 185.

Swivel base guaranteed not to slip. Pipe jaws are reversible. The Nos. 183 and 185 are furnished with wrought steel sliding bar which cannot break.

No.	Width of Jaw.	Holds Pipe.	Weight.	Price.
181	3½ in.	½ to 2½ in.	55 lbs.	\$16 00
182	4½ "	to 3 "	80 "	20 00
182½	5 "	to 4 "	120 "	28 00
183	6 "	to 6 "	185 "	35 00
185	7 "	to 8 "	240 "	60 00

Discount.....

"Monarch."

Swivel Base.

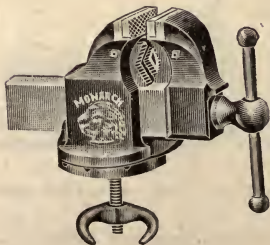


Fig. D. 446.

Pipe Jaws cut and milled from best quality of steel and are reversible.

No.	Width of Jaw.	Opens.	Weight.	Price.
401	3½ in.	2½ in.	44 lbs.	\$16 00
402	4½ "	3 "	65 "	20 00
403	5 "	4 "	110 "	28 00

Discount.....

PARKER'S PATENT BENCH VISES.

Stationary Base.

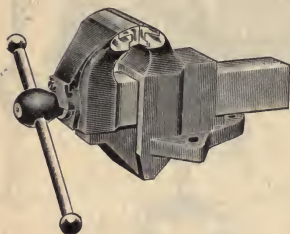


Fig. D. 447.

No.	Width of Jaw.	Opens.	Weig't.	Price.
000x	3½ in.	4½ in.	28 lbs.	\$ 6 25
1x	3½ "	5½ "	45 "	7 00
2x	4½ "	6½ "	58 "	9 00
3x	4½ "	8½ "	74 "	11 75
4x	5½ "	9½ "	104 "	16 25
5x	6½ "	10½ "	134 "	24 00
5½x	7 "	10½ "	190 "	30 00
* 60	8½ "	12½ "	240 "	50 00

Discount.....

Swivel Base.

No.	Width of Jaw.	Opens.	Weig't.	Price.
21x	3½ in.	4½ in.	33 lbs.	\$ 7 00
22x	3½ "	5½ "	52 "	8 75
23x	4½ "	6½ "	69 "	11 00
24x	4½ "	8½ "	88 "	14 50
25x	5½ "	9½ "	129 "	20 50
26x	6½ "	10½ "	176 "	30 00
26½x	7 "	10½ "	202 "	35 00
* 260	8½ "	12½ "	250 "	55 00

Discount.....

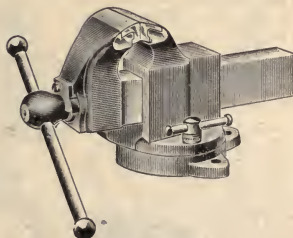


Fig. D. 448.

These Vises are made with a patented reinforced sliding jaw, consisting of a solid steel bar inserted the entire length of the slide, and thoroughly welded into the casting, thus rendering the slide, or movable jaw, practically unbreakable. No other vises made have this feature.

The steel faces of these Vises are milled and fitted to the jaws and are renewable.

*Nos. 60 and 260 are designed to meet the requirements of Railways and Machine Shops for heavy work.

● PRENTISS' PATENT VISES.

Stationary Base, Adjustable Jaw.

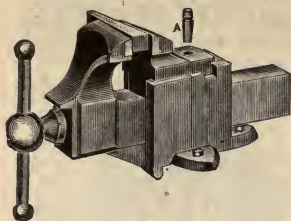


Fig. D. 449.

No.	Width of Jaw.	Opens.	Weight.	Price.
1	2 $\frac{5}{8}$ in.	3 $\frac{1}{2}$ in.	13 $\frac{1}{2}$ lbs.	\$ 5 50
2	3 $\frac{1}{2}$ " "	4 $\frac{3}{4}$ " "	28 " "	7 00
2 $\frac{1}{2}$	4 " "	5 $\frac{1}{4}$ " "	41 " "	9 00
3	4 $\frac{1}{2}$ " "	6 " "	54 " "	10 50
4	5 $\frac{1}{4}$ " "	8 " "	96 " "	17 00
5	6 " "	9 " "	146 " "	24 00
6	7 " "	11 " "	184 " "	30 00

Discount.....

Swivel Base, Adjustable Jaw.

No.	Width of Jaw.	Opens.	Weight.	Price.
18	2 $\frac{5}{8}$ in.	3 $\frac{1}{2}$ in.	17 lbs.	\$ 6 75
19	3 $\frac{1}{2}$ " "	4 $\frac{3}{4}$ " "	32 " "	8 50
19 $\frac{1}{2}$	4 " "	5 $\frac{1}{4}$ " "	46 " "	10 50
20	4 $\frac{1}{2}$ " "	6 " "	65 " "	12 50
21	5 $\frac{1}{4}$ " "	8 " "	109 " "	19 00
22	6 " "	9 " "	168 " "	27 00
23	7 " "	11 " "	207 " "	35 00

Discount.....

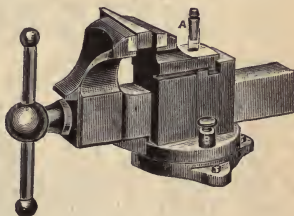


Fig. D. 450.

Machinists' "Bull Dog," Solid Jaw.

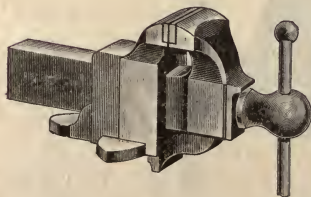


Fig. D. 451.

Width of Jaw, in.	Opens. in.	Stationary Base.			Swivel Base.		
		No.	Wgt. lbs.	Price.	No.	Wgt. lbs.	Price.
3 $\frac{1}{2}$	4	50	22	\$6 00	90	28	\$7 50
3 $\frac{3}{4}$	5 $\frac{1}{2}$	51	28	7 00	91	36	8 75
4	6	52	42	8 50	92	52	10 50
4 $\frac{1}{2}$	7	53	52	10 00	93	64	12 50
5	8	54	72	13 00	94	85	16 00
5 $\frac{1}{2}$	9	55	100	18 50	95	115	22 00
6	10	56	135	25 00	96	155	30 00
7	12	57	210	37 50	97	235	42 50

Discount.....

REED MACHINISTS' VISES.

These vises are practically unbreakable; are heavy, and all vital points are re-enforced. **Absolutely Guaranteed Against Breakage.**

Stationary Base.

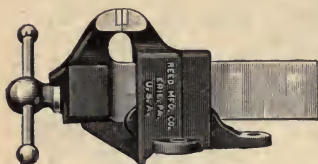


Fig. D. 452.

Vise No.	List Price Each.	Width of Jaw, Inches.	Weight, Pounds.	Jaws Open, Inches.	Depth Opening, Inches.
102	\$4 25	2	10 $\frac{3}{4}$	3	2
102 $\frac{1}{2}$	4 75	2 $\frac{1}{2}$	14	3 $\frac{1}{2}$	2 $\frac{5}{16}$
103	6 00	3	22	4	2 $\frac{1}{8}$
103 $\frac{1}{2}$	7 00	3 $\frac{1}{2}$	29	5	2 $\frac{1}{4}$
104	8 50	4	41	6	2 $\frac{3}{8}$
104 $\frac{1}{2}$	10 00	4 $\frac{1}{2}$	54	7	3 $\frac{1}{4}$
105	13 00	5	71	8	3 $\frac{3}{8}$
105 $\frac{1}{2}$	18 50	5 $\frac{1}{2}$	105	9	4
106	25 00	6	123	10	4 $\frac{1}{2}$
107	37 50	7	174	12	5 $\frac{1}{8}$
108	50 00	8	248	12	5 $\frac{5}{16}$
109	62 50	9	290	13	5 $\frac{1}{2}$

Discount.....

Swivel Base.

Vise No.	List Price Each.	Width of Jaw, Inches.	Weight, Pounds.	Jaws Open, Inches.	Depth Opening, Inches.
202	\$4 75	2	12 $\frac{1}{2}$	3	2
202 $\frac{1}{2}$	5 25	2 $\frac{1}{2}$	18	3 $\frac{1}{2}$	2 $\frac{5}{16}$
203	7 50	3	28	4	2 $\frac{1}{8}$
203 $\frac{1}{2}$	8 75	3 $\frac{1}{2}$	36	5	2 $\frac{1}{4}$
204	10 50	4	49	6	2 $\frac{3}{8}$
204 $\frac{1}{2}$	12 50	4 $\frac{1}{2}$	64	7	3 $\frac{1}{4}$
205	16 00	5	87	8	3 $\frac{3}{8}$
205 $\frac{1}{2}$	22 00	5 $\frac{1}{2}$	118	9	4
206	30 00	6	147	10	4 $\frac{1}{2}$
207	42 50	7	203	12	5 $\frac{1}{8}$
208	55 00	8	278	12	5 $\frac{5}{16}$
209	67 50	9	324	13	5 $\frac{1}{2}$

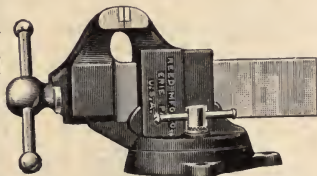


Fig. D. 453.

Discount.....

HEAVY CHIPPING VISE.

Prentiss.

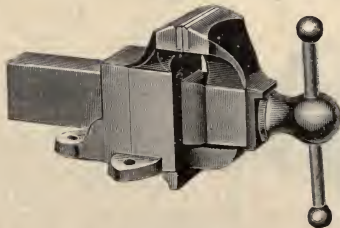


Fig. D. 454.

No. 58, 8 $\frac{1}{2}$ -inch jaw, opens 12 inches, weight 275 lbs. price, \$50 00
 Swivel bottom attachment for this vise " 5 00

Discount.....

REED MACHINISTS' VISES.

These self-adjusting jaw vises are lower in design than others, so that they can be placed on same height benches with standard swivel and stationary vises. Workmen do not have to stand on platforms to work at our self-adjusting jaw vises. **Absolutely Guaranteed Against Breakage.**

The back jaws of these vises are self-adjusting, and when in use conform automatically to any angle and make firm the objects held. The self-adjusting jaw feature is of such a design that it is absolutely as strong and durable as a solid jaw.

Stationary Base, Self-Adjustable Jaw.

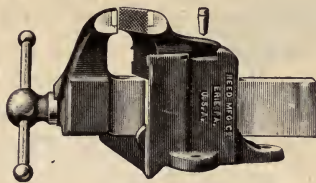


Fig. D. 455.

Vise No.	List Price, Each.	Width of Jaw, Inches.	Weight, Pounds.	Jaws Open, Inches.	Depth Opening, Inches.
302	\$5 00	2	13	2½	2 ⅝
302½	5 50	2½	17	3	2 ⅞
303	6 25	3	25	3½	3 ⅞
303½	7 00	3½	34	4	3 ⅞
304	9 00	4	48	4½	3 ⅞
304½	10 50	4½	64	5½	4½
305	14 00	5	82	6½	4½
305½	17 00	5½	116	7	5 ⅞
306	24 00	6	141	9	5 ⅞
307	30 00	7	198	11½	6 ⅞
308	40 00	8	273	12	7

Discount.....

Swivel Base, Self-Adjustable Jaw.

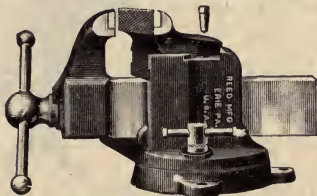


Fig. D. 456.

Vise No.	List Price, Each.	Width of Jaw, Inches.	Weight, Pounds.	Jaws Open, Inches.	Depth Opening, Inches.
402	\$ 6 25	2	15	2½	2 ⅝
402½	6 75	2½	20	3	2 ⅞
403	7 50	3	30	3½	3 ⅞
403½	8 50	3½	41	4	3 ⅞
404	10 50	4	56	4½	3 ⅞
404½	12 50	4½	72	5½	4½
405	16 00	5	98	6½	4½
405½	19 00	5½	138	7½	5 ⅞
406	27 00	6	157	9	5 ⅞
407	35 00	7	218	11½	6 ⅞
408	45 00	8	300	12	7

Discount.....

MASSEY VISES.

Perfect Quick Adjusting.

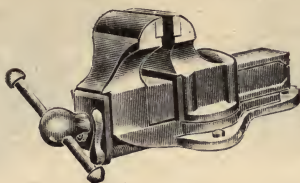


Fig. D. 461.

The hand grasping the handle-socket and fingers pressing trigger releases the nut from the screw, adjusts the loose jaw against the work and fastens it without the hand leaving the handle.

Stationary Bottom.					Swivel Bottom.				
	Width of Jaw. Ins.	Opens. Ins.	W'ght. Lbs.	Price.		Width of Jaw. Ins.	Opens. Ins.	W'ght. Lbs.	Price.
No. 0	3½	4½	32	\$ 7 75	No. 0	3½	4	40	\$ 8 75
" 1	4½	5½	42	9 50	" 1	4	5½	50	10 50
" 2	5	6	70	11 50	" 2	5	6	78	12 50
" 3	5½	8	109	17 50	" 3	5½	8	118	19 50
" 4	6½	9	140	23 00	" 4	6½	9	150	25 00

Discount.....

Lightning Grip Vise.

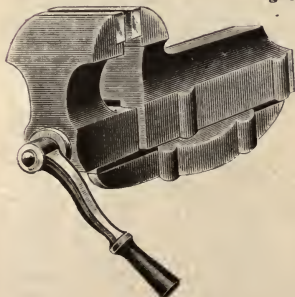


Fig. D. 462

All engaging parts steel. The loose jaw can be instantly adjusted and the work firmly fastened with a quarter turn of the handle. The handle is always out of the way of the workman, as shown in cut, when Vise in use.

Stationary or Swivel Base.

No.	Width of Jaw.	Opens.	Price
11	3½ in.	5 in.	\$ 8 50
12	4½ "	6 "	11 50
14	5½ "	8 "	17 50
16	7 "	11 "	30 00

Discount.....

VISES.

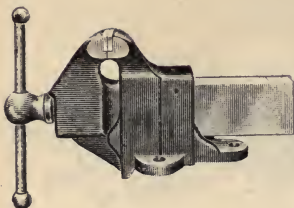


Fig. D. 463.
Stationary Base.

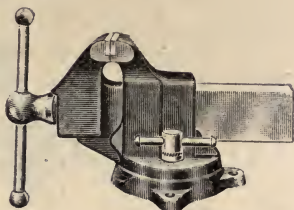


Fig. D. 464.
Swivel Base.

These vises have exceptionally wide jaws for their weights. A medium priced vise of high quality.

Width, Jaw, Inches.	Opens, Inches.	Stationary Base.			Swivel Base.		
		No.	Weight, Lbs.	Price.	No.	Weight, Lbs.	Price.
3	2½	190	17	\$ 6 00	170	20	\$ 7 50
3½	4	191	22	7 00	171	28	8 75
4	5	192	28	8 50	172	38	10 50
4½	6	193	42	10 00	173	54	12 00
5	6½	194	54	13 00	174	65	16 00
5½	7½	195	75	18 50	175	90	22 00
6	8½	196	101	25 00	176	120	30 00
7	10	197	135	30 00	177	136	40 00

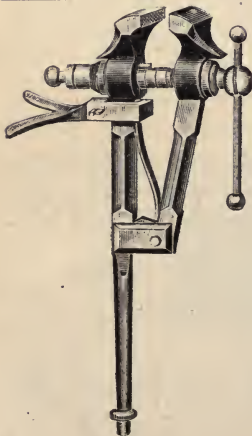


Fig. D. 465.

Discount.....

SOLID BOX VISES.

Width of Jaw.	No. and Approx. Weight.	Price.	Width of Jaw.	No. and Approx. Weight.	Price.
3½-in.	35 lbs.	\$10 00	6 in.	105 lbs.	\$23 00
4 "	40 "	10 50	6 "	110 "	24 00
4½ "	45 "	11 00	6 "	115 "	25 00
4½ "	50 "	11 50	6½ "	120 "	26 00
4½ "	55 "	12 00	6½ "	125 "	27 50
5 "	60 "	13 00	6½ "	130 "	29 00
5 "	65 "	14 00	6½ "	135 "	31 50
5½ "	70 "	15 00	7 "	140 "	33 00
5½ "	75 "	16 00	7 "	150 "	36 00
5½ "	80 "	17 50	7½ "	160 "	41 50
5½ "	85 "	18 50	7½ "	170 "	44 50
5½ "	90 "	20 00	7½ "	180 "	47 00
5½ "	95 "	21 00	7½ "	190 "	53 00
6 "	100 "	22 00	8 "	200 "	56 00

Discount.....

EMMERT UNIVERSAL PATTERN MAKERS' VISES.

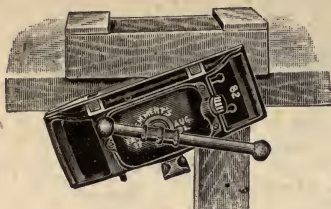


Fig. D. 466.
Normal position of vise on bench
with jaw at an angle for
tapered work.

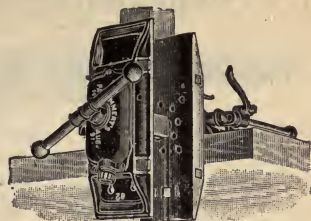


Fig. D. 467.
Vise reversed to hold work above
the bench.

This vise has six pairs of jaws, so that it is adapted to grasp any kind of work without regard to irregularity of form. The Emmert Universal Tool Makers' and Metal Workers' Vise is so constructed as to be used in any conceivable position. It is supplied with one set of grooved jaws to hold all classes of round work, one set of jaws which will hold any class of taper work, one set to hold copper work, and one set to hold any size ring. It is also supplied with a rough jaw for cast-iron work, with one smooth jaw for finished work.

Number	1	2
Size of Jaw.....inches	7 x 18½	5 x 14
Opens....."	14	12
Weight.....pounds	86	56
Price.....each	\$15 00	\$12 50

EMMERT UNIVERSAL MACHINISTS' VISES.

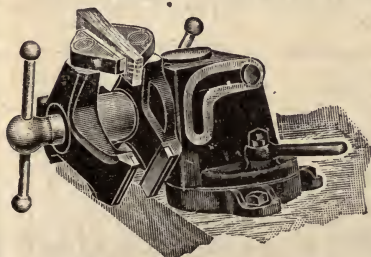


Fig. D. 468.
Vise in its natural position for
handling rough castings.

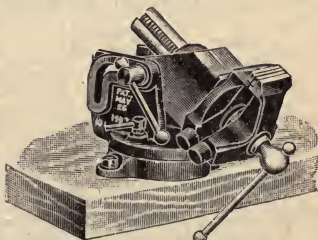


Fig. D. 469.
Vise at angle to bring work to a
position to be worked on with
convenience to the workman.

Number	4A	5A	6A	10A
Size of Jaw.....inches	4	2	3	6
Opens....."	6	3½	5	9
Weight.....pounds	100	12	55	230
Price.....each	\$12 50	\$7 00	\$10 00	\$22 50

Discount.....

PRICE LIST OF FILES AND RASPS.

List of November 1st, 1899.



Fig. D. 470.

Price, Per Dozen.

Mill, One Round Edge.				Mill, Two Round Edges.			Tapers.		
Inch.	Bas-tard.	2d. Cut	Smooth	Bas-tard.	2d. Cut	Smooth	Inches	Single Cut.	D'ble Cut.
4	\$ 3 40	\$ 3 90	\$ 4 40	\$ 3 80	\$ 4 40	\$ 4 90	3	\$ 2 10	\$ 2 50
5	3 60	4 30	4 60	4 00	4 80	5 10	3½	2 10	2 50
6	3 90	4 50	5 10	4 40	5 00	5 60	4	2 20	2 90
7	4 40	5 20	5 50	4 90	5 80	6 10	4½	2 40	3 10
8	4 80	5 50	6 10	5 40	6 10	6 80	5	2 60	3 50
9	5 50	6 50	7 10	6 10	7 30	7 90	5½	3 00	4 00
10	6 30	7 20	7 90	7 00	8 00	8 80	6	3 40	4 70
11	7 50	8 80	9 60	8 40	9 80	10 60	7	4 30	5 60
12	8 40	9 70	10 60	9 40	10 80	11 80	8	5 40	6 70
13	10 60	12 00	13 20	11 80	13 40	14 60	9	6 60	8 10
14	12 00	13 70	14 70	13 40	15 30	16 40	10	8 10	9 70
15	14 70	16 90	18 10	16 40	18 80	20 10	11	10 70	12 10
16	16 50	18 90	20 10	18 40	21 00	22 40	12	12 50	14 70
17	20 50	22 70	24 40	22 80	25 30	27 10	13	15 90	17 50
18	22 70	25 50	27 30	25 30	28 40	30 40	14	18 20	20 60

Slim Tapers.			Bandsaw, Blunt and Taper.		Wood Files.				Wood Rasps.		
Inch.	Single Cut.	D'ble Cut.	Regu- lar.	Slim	Inch.	Flat.	Half Rnd.	Cabinet	Flat.	Half Rnd.	Cabinet
3	\$2 10	\$2 50	\$2 50	\$2 50	6	\$4 30	\$6 10	\$ 8 10	\$ 7 40	\$ 8 10	\$10 10
3½	2 10	2 50	2 50	2 50	7	4 80	7 00	9 30	8 60	9 30	11 70
4	2 20	2 60	2 90	2 60	8	5 30	7 50	10 10	9 40	10 10	12 80
4½	2 30	3 00	3 10	3 00	9	6 30	8 50	12 20	11 40	12 20	15 15
5	2 50	3 20	3 50	3 20	10	7 00	9 10	13 70	12 80	13 70	17 50
5½	2 90	3 50	4 00	3 50	11	8 60	10 70	16 80	15 50	16 80	20 70
6	3 10	3 90	4 70	3 90	12	9 70	11 80	18 70	17 50	18 70	22 80
7	3 80	4 50	5 60	4 50	13	11 80	14 10	22 40	20 90	22 40	26 80
8	4 50	5 30	6 70	5 30	14	13 30	15 50	24 80	23 20	24 80	29 60
9	5 40	6 30	8 10	6 30	15	16 00	18 50	29 70	27 80	29 70	33 90
10	6 40	7 50	9 70	7 50	16	17 80	20 60	32 90	30 80	32 90	36 90
11	8 30	9 10	12 10	9 10	17	21 50	24 70	38 90	36 20	38 90	42 40
12	9 50	11 00	14 70	11 00	18	23 90	27 50	43 60	40 90	43 60	46 90
13	12 10	13 10	17 50	13 10	...	...	...	...	...	...	...
14	13 80	15 40	20 60	15 40	...	...	...	...	...	...	...

Discount.....?

PRICE LIST OF FILES AND RASPS.

List of November 1st, 1899.



Fig. D. 471.

Price, Per Dozen.

Mill and Round.				Flat.			Square.		
Inch.	Bas- tard.	2d Cut.	Smooth	Bas- tard.	2d Cut.	Smooth	Bas- tard.	2d Cut.	Smooth
4	\$ 3 00	\$ 3 50	\$ 3 90	\$ 3 70	\$ 4 30	\$ 4 70	\$ 3 80	\$ 4 60	\$ 4 90
5	3 20	3 80	4 10	3 90	4 60	4 90	4 10	4 80	5 30
6	3 50	4 00	4 50	4 30	4 80	5 30	4 60	5 10	5 50
7	3 90	4 60	4 90	4 80	5 50	6 10	5 10	5 80	6 30
8	4 30	4 90	5 40	5 30	6 10	6 60	5 50	6 30	7 00
9	4 90	5 80	6 30	6 30	7 20	7 90	6 60	7 70	8 30
10	5 60	6 40	7 00	7 00	8 10	8 70	7 40	8 50	9 10
11	6 70	7 80	8 50	8 60	9 80	10 70	9 10	10 40	11 30
12	7 50	8 60	9 40	9 70	11 00	12 10	10 20	11 50	12 80
13	9 40	10 70	11 70	11 80	13 60	14 70	12 50	14 30	15 40
14	10 70	12 20	13 10	13 30	15 30	16 70	13 90	16 10	17 50
15	13 10	15 00	16 10	16 00	18 30	20 00	16 90	19 20	20 90
16	14 70	16 80	17 90	17 80	20 10	22 30	18 70	21 20	23 30
17	18 20	20 20	21 70	21 50	24 20	26 50	22 50	25 40	27 50
18	20 20	22 70	24 30	23 90	26 80	29 20	25 10	28 20	30 40
19	24 60	27 50	29 40	28 40	31 60	34 60	29 70	33 20	35 70
20	27 40	30 70	32 90	31 50	35 30	38 30	32 80	36 70	39 30

Mill Blunt, D'ble. Cut,
advance 2 in.
Mill, Double Cut, adv. 1 in.
Mill, Narrow Point, adv. 1 in.

Cant (Blunt),
Double Cut,
advance 2 in.

Square Blunt,
advance 1 in.

Knife.				Warding.		
Inch.	Bas- tard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.
4	\$ 5 40	\$ 6 10	\$ 6 40	\$ 4 00	\$ 4 80	\$ 5 40
5	6 10	6 70	7 10	4 50	5 30	5 80
6	6 90	7 50	7 90	4 90	5 90	6 40
7	7 80	8 50	8 90	5 90	6 90	7 50
8	8 50	9 10	9 50	6 40	7 50	8 20
9	9 40	10 60	11 30	7 80	9 00	9 90
10	10 10	11 50	12 30	8 70	10 10	11 00
11	12 20	13 70	14 60	10 90	12 70	13 70
12	13 70	15 20	16 10	12 30	14 30	15 40
13	16 30	17 90	19 20	15 20	17 40	18 70
14	18 20	19 90	21 20	17 00	19 40	21 00

Discount.....

PRICE LIST OF FILES AND RASPS.

List of November 1st, 1899.



Fig. D. 472.

Price, Per Dozen.

Hand and Pillar.				Half-Round and Three Square.			Pit Saw.	Cant Saw.	Cross Cut.	Hook Tooth.
Inch.	Bas- tard.	2d Cut.	Smooth	Bas- tard.	2d Cut.	Smooth	Single Cut.	Single Cut.	Single Cut.	Single Cut.
4	\$3 70	\$4 30	\$4 80	\$4 80	\$5 60	\$6 10	\$ 4 80	\$ 4 30	\$ 4 80	.....
5	3 90	4 70	5 30	5 40	6 10	6 40	5 40	4 70	5 40	.....
6	4 30	5 10	5 60	6 10	6 70	7 10	6 10	5 40	6 10	\$ 6 70
7	4 90	5 80	6 30	7 00	7 70	8 20	7 00	6 10	7 00	7 70
8	5 40	6 30	6 70	7 50	8 30	8 90	7 50	6 40	7 50	8 30
9	6 70	7 80	8 30	8 50	9 40	9 90	8 50	7 80	8 50	9 40
10	7 50	8 70	9 40	9 10	10 10	10 70	9 10	8 70	9 10	10 10
11	9 40	10 90	11 80	10 70	11 80	12 70	10 70	10 40	10 70	11 80
12	10 70	12 30	13 50	11 80	13 00	13 90	11 80	11 40	11 80	13 00
13	13 30	15 20	16 20	14 10	15 40	16 60	Climax, adv. 2-in. on Half Round Bastard.			
14	15 00	17 00	18 20	15 50	17 00	18 30				
15	17 90	20 60	21 70	18 50	20 40	21 70				
16	20 10	22 80	24 20	20 60	22 50	24 20	Round Gulleting, take Pit-saw price.			
17	24 20	27 10	28 60	24 70	27 00	28 90				
18	26 80	29 90	31 50	27 50	29 90	32 00				
19	31 90	35 40	37 60	32 80	35 70	38 10	Double-Ended Taper.			
20	35 10	39 20	41 60	36 20	39 40	42 30				
Slotting (Blunt) adv. 2-in. Cotter, Blunt or Taper, adv. 2-in.				Ginsaw, take Bas- tard price.						
				Crossing, adv. 2-in.						
				Tumbler, adv. 2-in.						
				Feather Edge, (Blunt) adv. 2-in.						
				High Back Half Round adv. 2-in.						
				6	7	8	9	10		
				\$3 50	\$3 50	\$3 90	\$4 40	\$4 90		

Sizes below 4 inches, not extended, take 4-inch price.

Half inches not specified, take next higher full inch price.

Dead Smooth, double the price of Bastard Cut.

One Round Edge, advance $12\frac{1}{2}$ per cent.

Two Round Edges, advance 25 per cent.

All lengths above those listed, advance 20 per cent. on next lower inch price.

Blunt Files not specified, advance one-inch on respective kinds and cuts.

Single or Float Cut not specified, on regular shapes, take Double Cut price.

Equalings (Bellied), advance 2 inches on respective kinds and cuts.

Discount

STUBB'S TAPER SAW FILES.

Inches	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{1}{2}$
Three Square Tapers.	\$2 20	\$2 30	\$2 50	\$2 80	\$3 40	\$3 60
Inches	6	6 $\frac{1}{2}$	7	8	9	10
Three Square Tapers.	\$3 80	\$3 90	\$4 25	\$6 20	\$7 05	\$7 80

Discount

FILE CARDS.



Fig. D. 473.

Nicholson's.....	Doz.,	\$2 75
Colton's steel back.....	"	2 50

FILE HANDLES.

Hardwood.

Small size.....	Gross,	\$2 50
Medium size.....	"	2 75
Large size.....	"	3 25
Assorted sizes.....	"	3 00

GRINDSTONES.

Not Mounted.

Huron.....	per lb.....
Berea.....	"
Amherst.....	"

All stones over 200 pounds are sold by measurement weight; less than 200 pounds by cut weight. "Cut weight" is actual weight on scales as they come from the lathe, and is always cut on the stone.

Mounted Stone.

Price List.

No.	Stone Weighs.	Shipping Weight.	Per doz.
S 150	100 to 110 lbs.	150 lbs.	\$72 00
S 155	70 to 80 "	100 "	60 00
S 160	40 to 50 "	75 "	54 00

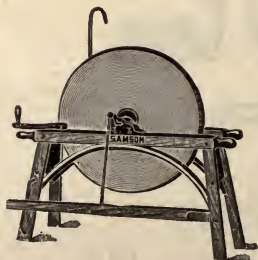


Fig. D. 474.

Discount.....

The usual thickness of stone mounted is from $1\frac{1}{4}$ to $2\frac{1}{4}$ inches.

Other sizes mounted to order.

GRINDSTONES.

"Hercules" Mounted.

Furnished with crank, treadle, water-trough and clothes protector.

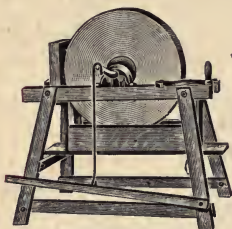


Fig. D. 475.

Sizes.	Diameter. Thickness.	Stone Weights About	Price Complete, Each.
No. 1	24x2	80 lbs.	\$ 8 00
" 2	24x3	120 "	9 00
" 3	26x2½	115 "	9 50
" 4	26x3	140 "	10 00
" 5	28x3	165 "	11 50
" 7	30x2	125 "	11 00
" 7	30x3	185 "	12 00
" 7	30x4	240 "	14 00
" 8	32x2½	180 "	12 00
" 9	34x2	160 "	12 00
" 10	34x3	240 "	14 00

Discount.....

This frame furnished with pulley if desired for power, at small extra expense.

Grindstone Fixtures.

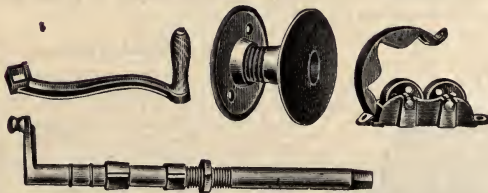


Fig. D. 476.

All parts are interchangeable. The shaft may be removed from the stone and replaced at will and the stone will always run perfectly true.

Per Dozen.....\$10 00

Discount.....

GRINDSTONES.

"Auto" Double Treadle Mounted.

Mounted with genuine Berea or Huron Stone. Frame made of seasoned hardwood, extra heavy, embracing the bicycle feature. Fitted on crank and shaft with improved ball bearings—encased—balls cannot work loose or drop out. Also supplied with stamped steel seat and clothes protector.

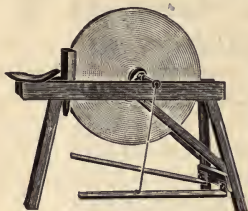


Fig. D. 477.

No.	Stone Weighs.	Shipping Weight.	Price, Complete, Each.
A-120	100 to 110 lbs.	150 lbs.	\$6 00
A-130	70 to 80 lbs.	110 lbs.	5 50
A-140	40 to 50 lbs.	90 lbs.	5 00

Discount.....

The usual thickness of stone mounted is from $1\frac{1}{2}$ to $2\frac{1}{4}$ inches.

Iron Frame Power Grindstone.

Frame	46x5 in.	} Weight, 700 lbs.
No. 1, Stone, to	50x8 in.	
" 2, "	36x4½ in. to 40 x 6 in.	} Weight, 450 lbs.
" 3, "	30 x 3 in. to 30 x 4½ in.	

Prices upon application.

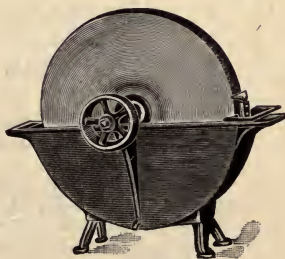


Fig. D. 478.

SCYTHE STONES.

Price, per Gross.....\$5 00

Discount.....

SOLID EMERY AND CORUNDUM WHEELS.

Diameter in Inches.	Thickness of Wheels in Inches.										Revolutions per Minute.
	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	
1	25	30	35	40	45	50	55	60	65	70	75
$1\frac{1}{8}$	30	35	40	45	50	55	60	65	70	75	80
2	35	40	45	50	55	60	65	70	75	80	85
$2\frac{1}{8}$	40	45	50	55	60	65	70	75	80	85	90
3	45	50	55	60	65	70	75	80	85	90	95
$3\frac{1}{8}$	50	55	60	65	70	75	80	85	90	95	100
4	55	60	65	70	75	80	85	90	95	100	105
$4\frac{1}{8}$	60	65	70	75	80	85	90	95	100	105	110
5	65	70	75	80	85	90	95	100	105	110	115
$5\frac{1}{8}$	70	75	80	85	90	95	100	105	110	115	120
6	75	80	85	90	95	100	105	110	115	120	125
$6\frac{1}{8}$	80	85	90	95	100	105	110	115	120	125	130
7	85	90	95	100	105	110	115	120	125	130	135
$7\frac{1}{8}$	90	95	100	105	110	115	120	125	130	135	140
8	95	100	105	110	115	120	125	130	135	140	145
$8\frac{1}{8}$	100	105	110	115	120	125	130	135	140	145	150
9	105	110	115	120	125	130	135	140	145	150	155
$9\frac{1}{8}$	110	115	120	125	130	135	140	145	150	155	160
10	115	120	125	130	135	140	145	150	155	160	165
$10\frac{1}{8}$	120	125	130	135	140	145	150	155	160	165	170
11	125	130	135	140	145	150	155	160	165	170	175
$11\frac{1}{8}$	130	135	140	145	150	155	160	165	170	175	180
12	135	140	145	150	155	160	165	170	175	180	185
$12\frac{1}{8}$	140	145	150	155	160	165	170	175	180	185	190
13	145	150	155	160	165	170	175	180	185	190	195
$13\frac{1}{8}$	150	155	160	165	170	175	180	185	190	195	200
14	155	160	165	170	175	180	185	190	195	200	205
$14\frac{1}{8}$	160	165	170	175	180	185	190	195	200	205	210
15	165	170	175	180	185	190	195	200	205	210	215
$15\frac{1}{8}$	170	175	180	185	190	195	200	205	210	215	220
16	175	180	185	190	195	200	205	210	215	220	225
$16\frac{1}{8}$	180	185	190	195	200	205	210	215	220	225	230
17	185	190	195	200	205	210	215	220	225	230	235
$17\frac{1}{8}$	190	195	200	205	210	215	220	225	230	235	240
18	195	200	205	210	215	220	225	230	235	240	245
$18\frac{1}{8}$	200	205	210	215	220	225	230	235	240	245	250
19	205	210	215	220	225	230	235	240	245	250	255
$19\frac{1}{8}$	210	215	220	225	230	235	240	245	250	255	260
20	215	220	225	230	235	240	245	250	255	260	265
$20\frac{1}{8}$	220	225	230	235	240	245	250	255	260	265	270
21	225	230	235	240	245	250	255	260	265	270	275
$21\frac{1}{8}$	230	235	240	245	250	255	260	265	270	275	280
22	235	240	245	250	255	260	265	270	275	280	285
$22\frac{1}{8}$	240	245	250	255	260	265	270	275	280	285	290
23	245	250	255	260	265	270	275	280	285	290	295
$23\frac{1}{8}$	250	255	260	265	270	275	280	285	290	295	300
24	255	260	265	270	275	280	285	290	295	300	305
$24\frac{1}{8}$	260	265	270	275	280	285	290	295	300	305	310
25	265	270	275	280	285	290	295	300	305	310	315
$25\frac{1}{8}$	270	275	280	285	290	295	300	305	310	315	320
26	275	280	285	290	295	300	305	310	315	320	325
$26\frac{1}{8}$	280	285	290	295	300	305	310	315	320	325	330
27	285	290	295	300	305	310	315	320	325	330	335
$27\frac{1}{8}$	290	295	300	305	310	315	320	325	330	335	340
28	295	300	305	310	315	320	325	330	335	340	345
$28\frac{1}{8}$	300	305	310	315	320	325	330	335	340	345	350
29	305	310	315	320	325	330	335	340	345	350	355
$29\frac{1}{8}$	310	315	320	325	330	335	340	345	350	355	360
30	315	320	325	330	335	340	345	350	355	360	365
$30\frac{1}{8}$	320	325	330	335	340	345	350	355	360	365	370
31	325	330	335	340	345	350	355	360	365	370	375
$31\frac{1}{8}$	330	335	340	345	350	355	360	365	370	375	380
32	335	340	345	350	355	360	365	370	375	380	385
$32\frac{1}{8}$	340	345	350	355	360	365	370	375	380	385	390
33	345	350	355	360	365	370	375	380	385	390	395
$33\frac{1}{8}$	350	355	360	365	370	375	380	385	390	395	400
34	355	360	365	370	375	380	385	390	395	400	405
$34\frac{1}{8}$	360	365	370	375	380	385	390	395	400	405	410
35	365	370	375	380	385	390	395	400	405	410	415
$35\frac{1}{8}$	370	375	380	385	390	395	400	405	410	415	420
36	375	380	385	390	395	400	405	410	415	420	425
$36\frac{1}{8}$	380	385	390	395	400	405	410	415	420	425	430

All wheels smaller or thinner than $\frac{1}{4}$ x 1 inch take same list as $\frac{1}{4}$ x 1 inch.

Discount.....

EMERY CYLINDERS AND CUP WHEELS.**Cylinders.**

Outside Diam. Inches.	Thickness of Rim.						
	1	1½	2	2½	3	3½	4
8	\$15 50						
9	16 50	\$22 00					
10	17 75	24 25	\$29 50				
12	18 75	26 25	33 00	\$38 75	\$ 44 00		
14	22 50	31 00	38 50	45 50	51 50	\$ 57 50	\$ 61 50
16	26 00	35 75	44 60	53 00	60 25	67 60	73 00
18	28 80	40 25	51 40	61 40	71 00	79 00	86 90
20	30 90	44 00	56 25	67 40	78 50	87 60	97 00
22	35 00	49 75	65 00	79 40	91 50	103 90	115 50
24	37 50	54 25	70 50	86 25	99 50	113 60	126 60
26	39 75	59 80	77 00	93 00	109 25	124 75	139 25

Above list is figured on a basis of cylinders 7 inches long, other length at proportionate rates.

Cup Wheels.

To obtain price of Cup Wheels, add to the price of Cylinder of same dimensions, the price of a regular wheel whose diameter is the inside diameter of the cylinder, and thickness whatever is required.

Discount.....

EMERY WHEEL DRESSERS.**Huntington.**

Fig. D 479.

For Truing, Shaping, Sharpening and Removing Glaze from Solid Emery Wheels running at full speed.

Prices.

Patent Emery Wheel Dresser (2 sets of Cutters).....\$2 50
Extra Cutters.....per set, 30

Discount.....

Sherman

Fig. D 480

Cutters consist of three corrugated discs, which always remain sharp as the corrugated face remains the same until worn down almost to the spindle. The concave washers between these cutters prevent the sides of handle from wearing.

No. 1, complete with two sets of Cutterseach, \$1 50
Extra Cutters.....per set, 15
No. 2, complete with one set of Cutterseach, 2 00
Extra Cutters.....per set, 25

Discount.....

EMERY WHEEL DRESSERS.

Black Diamond.



Fig. D. 481.



Fig. D. 482.

Prices are governed by size of diamond.

Prices of Hand Tools: \$12 00 to \$30 00 each.

Prices of Lathe Tools: \$25 00 to \$50 00 "

EMERY WHEEL GRINDERS.



Fig. D. 483. Floor.

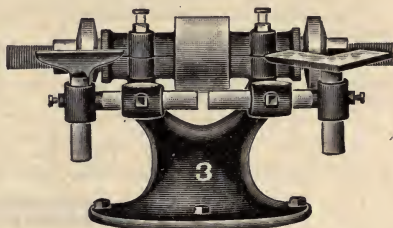


Fig. D. 484.

Bench.

Extra strong Grinders for tools, castings, etc.
Have adjustable boxes, long babbitted bearings,
dust caps and brass oil cups.

The Nos. 2, 3 and 4 Grinders have adjustable
rests.

Dimensions	No. 1	No. 2	No. 3	No. 4
Size of wheel.....	6x1x $\frac{1}{2}$ in.	8x1x $\frac{1}{2}$ in.	10x1 $\frac{1}{2}$ x1 in.	12x2x1 $\frac{1}{2}$ in.
Height from floor to head.....	33 "	33 "	32 "	32 "
Height to center of spindle.....	38 "	39 "	39 "	40 $\frac{1}{2}$ "
Length of spindle.....	10 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	18 $\frac{1}{2}$ "	27 $\frac{1}{2}$ "
Diameter of pulley.....	2 "	2 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "	5 "
Face of pulley.....	1 $\frac{1}{2}$ "	2 "	2 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
Weight.....	49 lbs.	75 lbs.	115 lbs.	175 lbs.
Speed of countershaft.....	600 rev.	500 rev.	550 rev.	475 rev.
Diameter of fast and loose pulley	4 in.	5 in.	6 in.	6 in.
Price, Floor Grinder.....	\$12 00	\$17 50	\$26 00	\$35 00
Price, Bench Grinder.....	5 00	10 00	15 00	20 00
Price, Pedestal only, inc. pan....	7 00	7 50	11 00	15 00
Price, Countershafts.....	5 00	7 50	10 00	11 00

Discount.....

POLISHING MATERIALS.**Emery.**

Nos. 4 to 46.....	per lb., \$0 06
" 54 to 150.....	" 07
Flour.....	" 05

Tripoli.

Flour, in barrels.....	per lb., \$0 03
Cake.....	" 06

*Discount.....***METAL POLISH.****Matchless.**

Has been adopted by United States Army,
Pullman Co., etc.

	Per Gross
No. 2. 3 oz. boxes.....	\$ 5 35
No 3. 4 oz. boxes.....	8 50
No. 4. 8 oz. boxes.....	15 00
No. 5. 16 oz. boxes.....	25 00
	Per Doz
3 lb. pails.....	\$ 7 25
5 lb. pails.....	10 40
10 lb. pails.....	18 00
25 lb. pails.....	40 00

Discount.....

Putz Pomade.....	per lb. \$.....
------------------	-----------------



Fig. D. 485.

**Mexoline (Liquid) Metal Polish.**

	Per Doz.	Per Gross
Half pint tin cans.....	.....	\$12 00
One pint tin cans.....	.....	24 00
One quart tin cans.....	\$3 25	.....
Half gallon tin cans.....	4 75	.....
One gallon tin cans.....	9 00	.....

Discount.....

Fig. D. 486.

XXX "White Diamond" Buffing Compound.

For polishing and coloring all metals where the higher color is required, with the greatest economy of time, and especially for work that is engraved or ornamented where rouge is objectionable. Put up in cakes similar to Tripoli.

Per lb.....	\$.....
-------------	---------

XXXX "White Diamond" Polishing Compound.

This is an extra fine polishing material and is largely used for silver and silver-plated ware. It is made from pure white stock, leaving the work practically clean, doing away with the necessity of further washing. Put up in square cakes.

Per lb.....	\$.....
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SAND, EMERY AND GARNET PAPER AND CLOTH.

List August 20, 1909.

Flint Paper.—Per Ream.

Sheets 9x11		9x12	Sheets 8½x10½	
Nos. 000 to ½.....	\$ 6 25	\$ 8 25	Nos. 00 to ½.....	\$4 25
No. 1	6 75	8 75	No. 1	4 75
" 1½	7 25	9 25	" 1½	4 75
" 2	7 75	9 75	" 2	4 75
" 2½	8 25	10 25	" 2½	5 25
" 3	9 50	12 25	" 3	5 25
" 3½	10 75	13 75		
" 4	11 75	15 25		
Assorted.....	7 25	.....	

*Discount.....***Flint Paper—Per Roll.**

Rolls 50 yards each.

Nos. 00 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½	No. 4
24 inches.... \$ 6 75	\$ 7 25	\$ 7 75	\$ 8 50	\$ 9 25	\$10 25	\$11 25	\$12 25
30 " 9 00	9 50	10 00	10 50	11 00	12 00	14 00	16 50
36 " 11 00	11 50	12 00	12 50	13 25	14 25	16 50	18 75
40 " 13 25	13 75	14 25	14 75	15 50	16 75	19 00	22 00
42 " 14 25	14 75	15 25	15 75	16 50	18 00	20 00	23 00
48 " 16 50	18 00	18 50	19 25	20 00	22 00	25 50	29 00

*Discount.....***Emery Paper—Per Ream.**

In sheets 9x11 inches.

Nos. 00 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½	Ass'd
\$10 25	\$12 00	\$12 75	\$13 50	\$15 50	\$18 25	\$21 25	\$12 75

*Discount.....***Emery Paper.—Per Roll.**

24 inches wide and 50 yards long.

Nos. 00 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½
\$11 00	\$12 75	\$13 25	\$13 75	\$15 75	\$19 25	\$22 00

Discount.....

NOTE: 24 sheets to a quire—20 quires to a ream.

SAND, EMERY AND GARNET PAPER AND CLOTH.

List August 20, 1909.

Emery Cloth.—Per Ream.

In sheets 9 x 11 inches.

Crocus Cloth.	Nos. 000 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½	Asst'd
\$26 50	\$26 50	\$28 50	\$29 75	\$30 75	\$33 00	\$35 25	\$37 50	\$28 50

*Discount.....***Emery Cloth.—Per Roll.**

In rolls 50 yards long.

Width.	Nos. 000 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½
9 inches.....	\$ 9 25	\$10 50	\$11 00	\$11 50	\$12 00	\$13 25	\$14 25
18 ".....	18 50	21 00	22 00	23 00	24 00	26 50	28 50
27 ".....	27 75	31 50	33 00	34 50	36 00	39 75	42 75

*Discount.....***Garnet Paper.—Per Ream.**

In sheets 9 x 11 inches.

Nos. 000 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½	No. 4
\$6 50	\$7 00	\$7 50	\$8 00	\$8 50	\$9 75	\$11 00	\$12 00

*Discount.....***Garnet Paper.—Per Roll.**

In rolls 50 yards long.

Width	Nos. 00 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3	No. 3½	No. 4
24 inches.....	\$ 7 50	\$ 7 75	\$ 8 00	\$ 8 50	\$ 9 25	\$10 25	\$12 00	\$13 00
30 ".....	9 75	10 25	10 75	11 25	12 00	13 00	15 25	17 25
36 ".....	12 00	12 50	13 00	13 50	14 00	15 25	17 25	20 00
40 ".....	14 00	14 50	15 25	15 75	16 25	17 25	20 00	22 75
42 ".....	16 25	16 75	17 25	17 75	18 25	20 00	21 75	24 75
48 ".....	20 00	21 00	21 50	22 00	23 75	27 00	31 00	34 00

*Discount.....***Garnet Cloth.—Per Roll.**

In rolls 50 yards long.

Width	Nos. 0 to ½	No. 1	No. 1½	No. 2	No. 2½	No. 3
14 inches.....	\$14 00	\$15 00	\$15 50	\$16 00	\$16 50	\$17 00
28 ".....	28 00	30 00	31 00	32 00	33 00	34 00

Discount.....

NOTE: 24 sheets to a quire—20 quires to a ream.

STEEL TUBING.

SHELBY.

Cold Drawn Seamless.

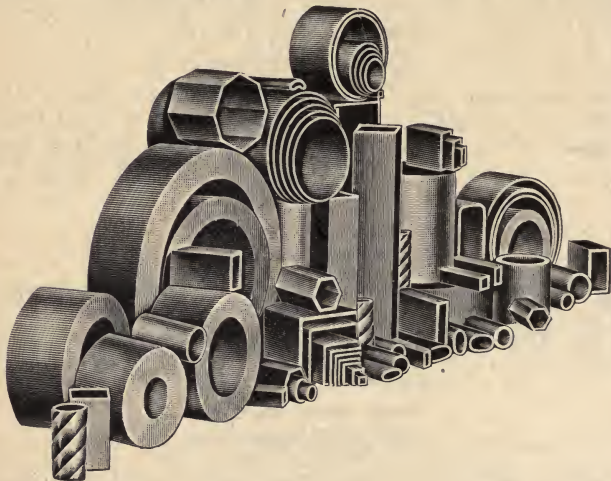


Fig. D. 487.

Shelby Steel Tubing in Different Shapes and Sizes.

For bushings, bearings, collars and all purposes requiring strength, uniformity, lightness and durability.

These Tubes are drawn from solid blocks of specially prepared and tested steel, and are drawn solid without weld or seam.

From $\frac{1}{4}$ to 20 inches outside diameter, and $\frac{1}{4}$ to 1 $\frac{1}{2}$ -inch thick.

We are now in a position to take care of our customers better than ever. In addition to our large warehouse at 259 E. Erie Street, Chicago, we have separate offices and warehouses at Chicago, St. Louis and Detroit, devoted exclusively to the sale and handling of **Shelby Cold Drawn Seamless Steel Tubing** (both round and square), and wrought pipe for structural and ornamental iron work.

Our Chicago branch is located at 107 N. Canal Street, our St. Louis branch at 123-125 Pine Street, and our Detroit branch at 29 East Atwater Street, at which places we carry complete stock of all standard sizes of steel tubing, and are in position to make prompt shipments.

Write for special catalogue and prices.

SAFE ENDS.

We are prepared to quote on Safe Ends. Please send specifications.



Fig. D. 488.

COPPER FERRULES.

Price..... per lb.....

Prices upon application.

TUBE EXPANDERS.

"Eclipse."

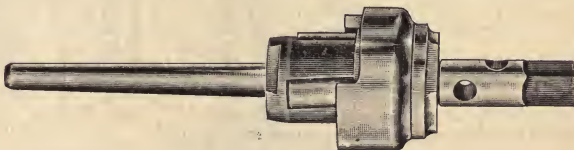


Fig. D. 489.

Self-Feed Roller.

This Expander is self-feeding. The body is milled from bar steel and tempered. Has anti-friction bearing plate back of feed collars, which is guaranteed to last during the life of the tool.

There are no screws or pins of any kind whatever used in the construction of this expander. The roller cage is so constructed that the rolls cannot drop either to the inside or outside when the mandrel is removed.

Can be used by hand, air drill or any other power without change.

Diameter, inches.....	1½	1¾	2	2½	2¾	3½	2½
Price, Complete.....	\$16 00	\$16 00	\$16 00	\$18 00	\$18 00	\$19 50	\$19 50
Diameter, inches.....	2½	2¾	3	3½	3¾	3½	4
Price, Complete.....	\$22 00	\$22 00	\$22 00	\$24 50	\$24 50	\$27 00	\$27 00

Discount.....

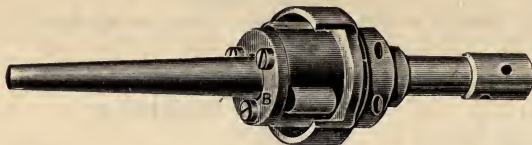
TUBE EXPANDERS.**Dudgeon Roller.**

Fig. D. 490.

SIZE.		Expander.	Mandrels.	Rollers.
1 $\frac{1}{4}$	Inches	\$ 15 00	\$1 75	25
1 $\frac{1}{2}$	"	17 00	1 75	25
2	"	20 00	2 25	25
2 $\frac{1}{2}$	"	25 00	2 50	25
2 $\frac{3}{4}$	"	29 00	3 00	30
3	"	34 00	3 00	30
3 $\frac{1}{2}$	"	39 00	3 50	35
3 $\frac{3}{4}$	"	44 00	3 50	35
4	"	48 00	4 00	40
4 $\frac{1}{2}$	"	58 00	4 50	45
5	"	60 00	4 50	50
6	"	75 00	5 00	60
7	"	90 00	6 00	75
		110 00	....	..

Dimensions refer to the external diameter of tubes.

Discount.....

Dudgeon Compound Roller.

This Tool will expand two sizes up to two inches, and three sizes above as shown in list.

SIZE.		Price.	Mandrels.		Rollers.
			Large.	Small.	Each.
1 $\frac{1}{4}$	and 1 $\frac{1}{2}$ Inches	\$20 00	\$1 75	\$1 50	\$0 25
1 $\frac{1}{2}$	" 1 $\frac{1}{2}$ "	22 00	2 00	1 75	25
1 $\frac{3}{4}$	" 2 "	25 00	2 25	1 75	25
2, 2 $\frac{1}{4}$	and 2 $\frac{1}{2}$ "	30 00	2 25	1 75	30
2 $\frac{1}{2}$, 2 $\frac{3}{4}$	" 2 $\frac{3}{4}$ "	35 00	2 50	1 75	30
2 $\frac{3}{4}$, 3	" 3 "	40 00	3 00	2 25	30
3, 3 $\frac{1}{4}$	" 3 $\frac{1}{4}$ "	45 00	3 00	2 50	35
3 $\frac{1}{4}$, 3 $\frac{1}{2}$	" 3 $\frac{1}{2}$ "	52 00	3 50	2 50	35
3 $\frac{1}{2}$, 3 $\frac{3}{4}$	" 3 $\frac{3}{4}$ "	60 00	3 50	3 00	40
3 $\frac{3}{4}$, 4	" 4 "	65 00	4 00	3 00	45
4, 4 $\frac{1}{4}$	" 4 $\frac{1}{4}$ "	70 00	4 00	3 50	50
4 $\frac{1}{4}$, 4 $\frac{1}{2}$	" 4 $\frac{1}{2}$ "	75 00	4 50	3 75	55
4 $\frac{1}{2}$, 4 $\frac{3}{4}$	" 4 $\frac{3}{4}$ "	80 00	4 50	4 00	60
4 $\frac{3}{4}$, 5	" 5 "	85 00	5 00	4 50	65
5, 5 $\frac{1}{4}$	" 5 $\frac{1}{4}$ "	90 00	5 00	4 50	75

Larger size to order.

Discount.....

TUBE EXPANDERS.**Dudgeon Roller Pattern.**

Fig. D. 491.

	OUTSIDE DIAMETER OF TUBE IN INCHES.															
SIZE. . . .	1	1½	1½	1½	2	2½	2½	2½	3	3½	3½	4	4½	5	6	
Price, each . . .	\$ 10 00	10 00	10 00	10 00	10 00	12 00	14 00	16 00	18 00	20 00	23 00	30 00	40 00	50 00	60 00	
Mandrels,	2 50	2 50	2 50	2 50	2 50	3 00	3 50	3 50	4 00	4 50	5 00	6 50	8 00	15 00	15 00	
Price, set of 3 rolls	1 00	1 00	1 00	1 00	1 00	1 15	1 30	1 45	1 60	1 75	2 00	2 50	3 50	4 00	5 00	

Also furnished with square head pins for motor use at an additional cost of 50 cents each net on 1 to 3 inch, and 75 cents each net on 3½ to 6 inch.

Discount.....

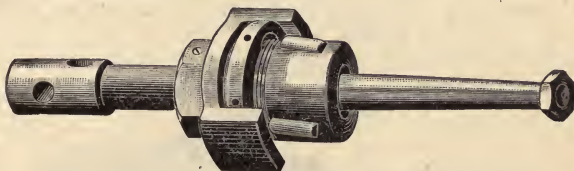
Henderer Patent Self-Feed Roller.**"Class H."**

Fig. D. 492.

This tool is rapid in its operation. The rolls being set at an angle with the mandrel have a tendency to draw mandrel into the tool, thus dispensing with the hammering on mandrel. Thrust ring is threaded to the body and may be adjusted to allow tubes to project any required length for beading.

Can be used in connection with pneumatic or other power appliances and mandrels can be made to fit any socket. Expanders for power use are similar in design as those for hand, except the feed is modified, and can be varied as occasion demands.

When ordering, specify if hand or power tools are wanted.

	OUTSIDE DIAMETER OF TUBE IN INCHES.															
SIZE...	1	1½	1½	1½	1½	2	2½	2½	2½	3	3½	4	4½	5	6	
Price, each...	\$ 12 00	12 00	12 00	14 00	15 00	16 00	18 00	20 00	23 00	26 00	32 00	38 00	44 00	50 00	60 00	

Discount.....

TUBE EXPANDERS.

Calumet.
Self-Feed Roller.



Fig. D. 493.

The body of this expander is milled from high grade bar steel and tempered. Equipped with combination mandrel for hand operation or motor drive. Our special cap on this expander overcomes entirely the falling out of the rolls when pintis removed.

SIZE.....	OUTSIDE DIAMETER OF TUBE IN INCHES.														
	1½	1½	1½	1½	2	2½	2½	2½	2½	3	3½	3½	4	6	
Price, each..	\$9 00	10 00	11 00	12 50	13 00	15 00	15 50	17 00	19 00	20 00	22 00	24 00	28 00	40 00	
Weight, each, lbs.	2	2½	2½	3	3½	3½	4½	5½	5½	8½	9½	11½	14	56	
Extra Rollers, each..	25	25	25	30	30	35	35	40	60	60	70	70	75	90	
Extra Mandrels.....	1 50	1 60	1 80	2 00	2 10	2 10	2 25	2 50	2 75	3 00	3 25	3 50	4 00	6 00	

Discount.....

Calumet.
Ball-Bearing, Self-Feed Roller.
For Power or Hand.

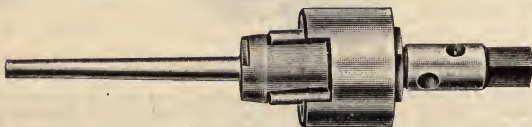


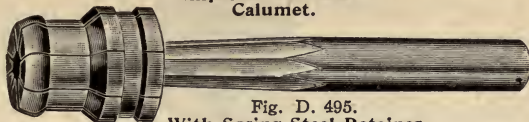
Fig. D. 494.

This expander is self-feeding and has ball-bearing back of the guide collar to prevent friction and wear. Made of best material and guaranteed. Can be used either by hand or with reversible air drill.

Tube Size, inches.....	1½	1½	2	2½	2½	2½	3	3½	4
Price, each.....	\$10 00	10 00	10 00	12 00	12 00	14 00	16 00	18 00	20 00
Weight, each, lbs.....	3½	3½	3½	4	4½	5½	8½	11½	14
Extra Mandrels, each..	4 00	4 15	4 30	5 00	5 30	5 60	6 40	8 00	10 70
Extra Set of 3 Rolls....	95	1 05	1 10	1 20	1 25	1 35	1 60	2 00	2 50

Discount.....

TUBE EXPANDERS.

Improved Sectional.
Calumet.Fig. D. 495.
With Spring Steel Retainer.Fig. D. 496.
With Rubber Ring.

Furnished with both rubber ring and spring steel retainer.

Size.....	OUTSIDE DIAMETER OF TUBE IN INCHES.															
	1	1½	1¾	1½	1¾	1½	1¾	2	2½	2¾	2½	2¾	2½	2¾	2½	3
Price, each...	\$ 8 00	8 00	9 00	9 00	11 00	11 00	12 00	12 00	12 50	13 00	14 00	15 00	16 50	18 00	22 00	
Extra Mandrels	1 50	1 50	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 50	2 50	2 50	2 50	
Extra Sections	60	60	80	80	85	85	90	90	95	1 00	1 05	1 10	1 15	1 20	1 75	

Discount.....

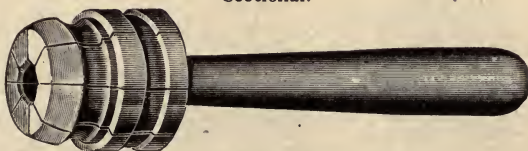
Prosser.
Sectional.

Fig. D. 497.

Size, inches.....	1	1½	1¾	1½	1¾	2	2½	2¾	2½	2¾
Price, each.....	\$11 00	\$11 00	\$11 00	\$11 00	\$12 00	\$12 00	\$13 00	\$13 00	\$15 00	\$18 00
Ex. Mandrels, each.	1 75	1 75	1 75	1 75	1 75	2 00	2 25	2 25	2 50	2 75
Ex. Springs, each...	75	75	75	75	75	75	90	90	90	1 00
Size, inches.....	3	3½	3¾	3½	4	4½	4¾	5	5½	6
Price, each.....	\$22 00	\$26 00	\$30 00	\$33 00	\$33 00	\$35 00	\$37 00	\$42 00	\$52 00	\$60 00
Ex. Mandrels, each.	3 00	3 25	3 50	4 00	4 00	4 50	4 50	8 00	10 00	12 00
Ex. Springs, each...	1 00	1 20	1 20	1 20	1 20	2 00	2 00	3 00	3 50	4 00

Discount.....

TUBE EXPANDERS.

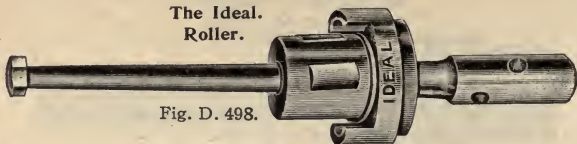
The Ideal.
Roller.

Fig. D. 498.

The body and collar of this expander are one piece, which eliminates the annoyance, delay and expense of collar and pin working loose or being lost. It has no screws or pins to break off, work loose or fall out. The guard which is held in position can be removed. One expander will answer for any thickness of tube sheet.

Diameter...Inches	1	1½	1½	1½	1½	2	2½	2½	2½	2½
Price....Complete	\$10 00	10 00	10 00	10 00	10 00	10 00	12 00	12 00	14 00	16 00
Diameter...Inches	3	3½	3½	3½	4	4½	4½	5	5½	6
Price....Complete	\$18 00	20 00	23 00	25 00	30 00	35 00	40 00	50 00	55 00	60 00

Discount.....

Self-Feed Roller Tube Expander.

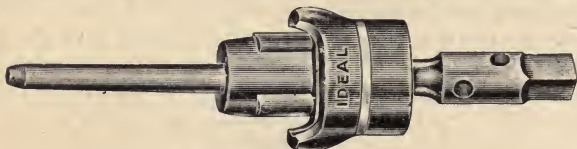
Phosphor
Bronze
Bearing.

Fig. D. 499.

This expander is machined out of a special steel, and tempered throughout with great care. Is simple, substantial, and is incomparable for durability in rapid tube rolling by power. It can be used by hand, reversible air drill or any other power without change. The guard has special phosphor bronze bearing, which prevents friction and wear; if necessary this can be removed to work close to the boiler shell or rivet line.

The roller frame is so constructed that the rolls cannot drop either to the inside or outside if the mandrel is removed—this is very important. The rolls are double the length of the ordinary expanders and reversible, making their life much longer, also preserving the life of the mandrel. There are no cap screws to break off or work loose.

We furnish as standard, the following square shank for the self-feed expander, unless otherwise ordered: Sizes 1 inch to 1½ inches, inclusive, ½ inch square; sizes 1½ inches to 2½ inches, inclusive, ¾ inch square; sizes 3 inches to 4½ inches, inclusive, 1 inch square.

Diameter, in.	1	1½	1½	1½	1½	1½	1½	1½	2	2½	2½
Price, Complete	\$16 00	16 00	16 00	16 00	16 00	16 00	16 00	16 00	16 00	18 00	18 00
Diameter, in.	2½	2½	2½	2½	3	3½	3½	3½	4	4½	4½
Price, Complete	\$19 50	19 50	22 00	22 00	22 00	24 50	24 50	27 00	27 00	37 00	39 50

Discount.....

TUBE EXPANDERS.

The Ideal.

Universal Reversible Guard Self-Feed Roller Tube Expander.



Fig. D. 500.

This expander has been adopted by some of the largest railroad systems and manufacturers of high pressure water tube boilers. It is unexcelled for locomotive and marine boilers, subject to jar.

This expander is similar to Fig. D. 499, shown on opposite page, in every respect except that the guard is reversible.

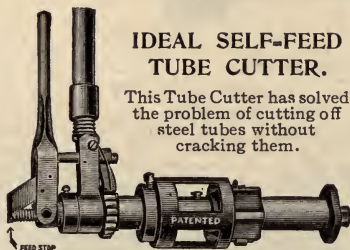
In the accompanying illustration the guard rubs against the tube, thus preventing the tube from being drawn out of the tube sheet.

When the guard is reversed, it rests upon the tube sheet and permits the rolling of tubes that project out from $\frac{1}{4}$ inch to 1 inch from the tube sheet, and if guard is removed, will roll tubes that project out $1\frac{1}{4}$ inches from the tube sheet.

One expander will answer for any thickness of tube sheet.

Diameter, in.	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$
Price, Complete	\$16 00	16 00	16 00	16 00	16 00	16 00	16 00	16 00	16 00	18 00	18 00
Diameter, in.	2 $\frac{3}{4}$	2 $\frac{1}{2}$	2 $\frac{5}{8}$	2 $\frac{1}{2}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$
Price, Complete	\$19 50	19 50	22 00	22 00	22 00	24 50	24 50	27 00	27 00	37 00	39 50

Discount.....

IDEAL SELF-FEED
TUBE CUTTER.

This Tube Cutter has solved the problem of cutting off steel tubes without cracking them.

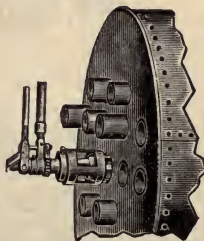


Fig. D. 501.

Fig. D. 501. View A.

New tubes are all cut off the same length from the boiler head no matter if they project out from $\frac{1}{4}$ inch to 4 inches (see Fig. D. 501, view A) they are cut with a bevel ready for beading, and rolled at the same time.

For cutting out old tubes on the inside of boiler heads, simply set the guard back, as shown in illustration, Fig. D. 501, which can be done in less than half a minute.

Diameter.....Inches	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$
Price.....Complete	\$14 00	14 00	14 00	16 00	20 00	20 00	22 00
Diameter.....Inches	3 $\frac{1}{4}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	5	5 $\frac{1}{4}$	6
Price.....Complete	\$22 00	22 00	30 00	30 00	32 00	32 00	32 00

Discount.....

COMBINED TUBE CUTTER AND EXPANDER.

For Cutting, Trimming and Expanding Boiler Tubes.

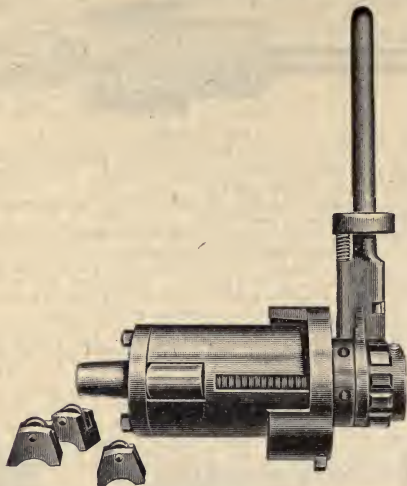


Fig. D. 502.

Can cut out a tube just inside of the tube sheet, trim it on the outside to the proper length, leaving it in the best possible shape for beading, and in two minutes change the tool to a perfect expander and roll the tube. The ratchet attachment insures speed and ease of management and can be operated where it is almost impossible to operate the old style expander.

The screw feed feature does away entirely with the use of a hammer. The rolls are made tapering, so as to conform to the taper of the mandrel, the pressure then being even across the full thickness of the tube sheet. Ratchet will work both the cutter and the expander, and has the shoe cutters fitted to go in from the inside, the same as the rolls fit the pocket, where they cannot drop out as in other types. Will drive both rolls and cutters, and no monkey-wrench is required to do the cutting. In changing the tool from cutter to expander, the pin in the mandrel must be taken out, and replaced when changing back.

Size, inches...	1½	1¾	2	2½	2¾	3	3½	3¾	4
Price.....	\$30 00	\$30 00	\$30 00	\$30 00	\$30 00	\$30 00	\$33 50	\$33 50	\$33 50

Discount.....

TUBE CLEANERS.

Perfection.
Self Adjusting.



Fig. D. 503.

Diam. of Flue	2 in.	2½ in.	2½ in.	2½ in.	3 in.	3½ in.	3½ in.	4 in.	4½ in.	5 in.	6 in.
Price, each...	\$2 00	\$2 25	\$2 50	\$2 75	\$3 00	\$3 25	\$3 50	\$4 00	\$5 00	\$6 00	\$7 00

Smaller sizes than 2-inch, same price as 2-inch.

Discount.....

Engineers' Favorite.

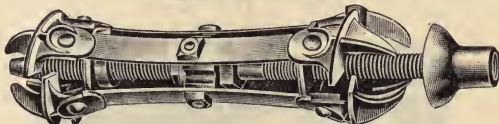


Fig. D. 504.

Size, inches..	1½	1½	2	2½	2½	2½	3	3½	3½	4	4½
Price, each...	\$2 00	\$2 00	\$2 00	\$2 25	\$2 50	\$2 75	\$3 00	\$3 25	\$3 50	\$4 00	\$4 50

Discount.....

Combination Favorite Flue Cleaners.

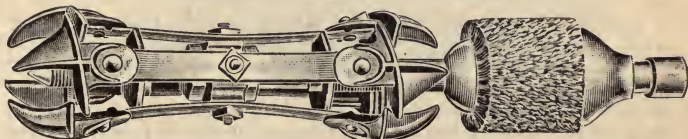


Fig. D. 505.

This is a combination of the well-known Engineer's Favorite Flue Cleaner with a wire brush attached, making one of the most effective tools for this purpose on the market.

	Price, each.		Price, each.
2 in. diameter	\$3 00	4 in. diameter	\$5 00
2½ in. "	3 50	4½ in. "	5 50
3 in. "	4 00	5 in. "	7 10
3½ in. "	4 50	6 in. "	8 30

Discount.....

Flue Brushes see Index.

TURBINE TUBE CLEANERS.

Liberty Standard.



Fig. D. 507

For Heavy Scale.

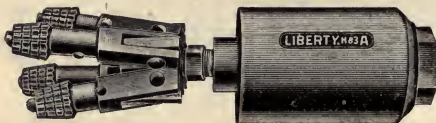


Fig. D. 508.

For Light Scale.

The freely swinging arm head shown attached to the turbine (Fig. D. 508) is used for light scale. The freely swinging arm is unscrewed from the shaft and the universal coupling and drill (Fig. D. 507) are attached in its place. The drill not only rotates at a very high speed, but has a combined rotating and gyrating effect (owing to the flexibility of the universal coupling), producing a rapid succession of hammer blows against the scale, which cuts it away at a very rapid rate. These drills are comparatively inexpensive, and when dull can be re-ground on a common emery wheel.

This tube cleaner is operated by *water pressure* only, and is made for all shapes of tubes.

Made in the following sizes: 2 in., 2½ in., 2¾ in., 3¼ in., 3½ in., 4 in.

Price.....\$90 00

Discount.....

TURBINE TUBE CLEANERS.

Liberty.

"Cyclone."

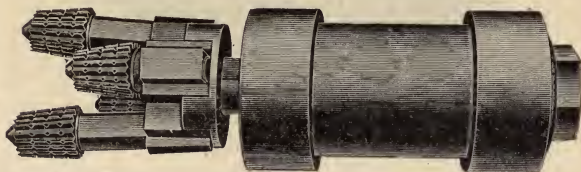


Fig. D. 509.

The "Cyclone" Tube Cleaner is driven by *air* or *steam*. It is a very efficient, powerful and durable tube cleaner. The semi-balanced blades prevent friction and air leakage. It is equipped with the Norivet head, which can be taken apart and assembled by hand.

Made in following sizes: $3\frac{1}{2}$ in., $3\frac{1}{2}$ in., 4 in.

Price.....\$150 00

Discount.....

"Bull Dog."

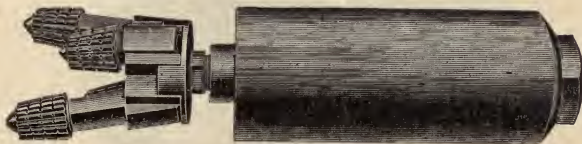


Fig. D. 510.

The "Bull Dog" Turbine Cleaner is a *water driven* machine, and a very powerful turbine cleaner. The body of the motor is cut out of a solid piece of machinery steel. Extra long bearings are used.

The "Bull Dog" is in a class by itself for heavy service. The machine, like the Cyclone, is also equipped with the Norivet head, which can be taken apart and put together by hand without the use of tools.

Made in the following sizes: 3 in., $3\frac{1}{2}$ in., $3\frac{1}{2}$ in., 4 in. (outside diam. of tubes).

Price.....\$150 00

Discount.....

TURBINE TUBE CLEANERS.

Weinland.

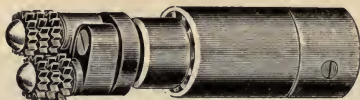


Fig D. 511.

No. 29

For Straight Tubes.

These are small cleaners used largely in tubes of locomotive and marine boilers, condensers, evaporators, etc. They are of the ball-bearing type having two-arm heads.

They are strong and well made, and are marvels of power, considering their size. We guarantee them fully. They are made in the following sizes:

No. 29 is $1\frac{1}{2}$ in. outside diameter for tubes 2 in. outside diameter.

No. 29 $\frac{1}{2}$ is $1\frac{3}{4}$ in. outside diameter for tubes $2\frac{1}{2}$ in. outside diameter.

No. 30 is 2 in. outside diameter for tubes $2\frac{1}{2}$ in. outside diameter.

No. 30 $\frac{1}{2}$ is $2\frac{1}{4}$ in. outside diameter for tubes $2\frac{3}{4}$ in. outside diameter.

When ordering, specify size of tube for which machine is wanted. Always give outside diameter. Operated by *water*.

With each machine we furnish a good supply of cutters, pins, etc.

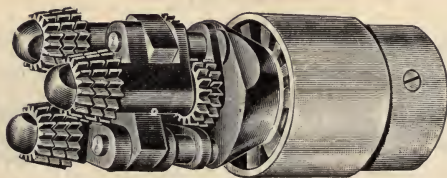


Fig. D. 512.

No. 71

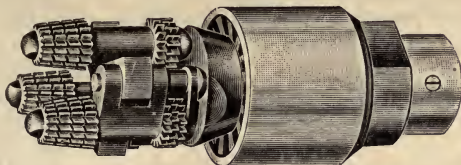
For 3 inch Straight Tubes and $3\frac{1}{2}$ inch Curved Tubes.

The No. 71 Turbine Driven Cleaner is short, compact and designed for use in boilers having curved tubes. It passes full around the bend, never stalls or jams or has to be forced. Is of the ball-bearing type and provided with the quick repair head. Operated by *water*.

Furnished with a good supply of extra cutters, pins and parts subject to wear.

The above Tube Cleaners are also made for Operation by Air or Steam.

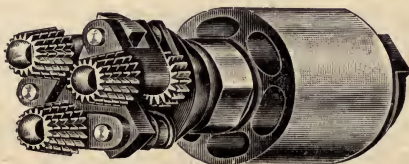
Prices on application.

TURBINE TUBE CLEANERS.**Weinland.****Fig. D. 513.****No. 72 for 3½-inch Straight Tubes.****No. 73 for 4-inch Straight Tubes.**

Unless otherwise specified we equip the Nos. 72 and 73 cleaners with the quick repair head, but if desired the rocker arm head can be furnished, or for a small additional cost we can supply both sizes.

These cleaners are especially effective where scale is neither heavy nor very hard. Operated by *water*.

Also of the ball-bearing type. A good equipment of extra parts is furnished with all cleaners.

**Fig. D. 514.****No. 65 for 3½-inch Tubes.****No. 66 for 4-inch Tubes.****Thrust Bearing Type.**

The Nos. 65 and 66 Thrust Bearing Cleaners are especially designed and adapted to conditions where the scale is heavy and hard. The parts of this machine are made large and strong enough to stand the maximum amount of severe usage and hard knocks. This cleaner develops, under 150 pounds water pressure, great power, hence the work is much more rapid than on the other types.

We equip the Nos. 65 and 66 with toggle joint and with our quick repair head, porcupine head, and four-way drill. These heads are found equal to most conditions, but the rocker arm head can be furnished in place of any of the above if desired, or will be supplied extra at a small additional cost. Operated by *water*.

Each machine is supplied with a good equipment of cutters, drills, pins, etc.

Above machines are also made for operation by air or steam.

Prices on application.

PNEUMATIC FLUE WELDER AND SWEDGER.

For Scarfing, Welding and Swedging all Sizes of Flues up to $4\frac{1}{2}$ Inches.

The Double Cylinder Welder is especially adapted for railroad work, where flues are swedged on the end for copper ferrule. A two inch flue can be welded and swedged in about five seconds with one heat, and with a perfect weld, smooth and even both inside and out, leaving the flues an even thickness.

Any length of safe end can be welded on by having a long mandrel and placing the machine directly behind the furnace, allowing the end of the flue to project through the dies while heating, and when hot, shoving forward until the weld comes under the dies.

Either the double or single machines are admirably adapted for light forging work, or for special work that requires very rapid blows.

All machines are interchangeable for either welding, swedging or scarfing dies. They take up a floor space of less than two feet square and strike 2,000 blows per minute with 80 to 100 pounds of air.

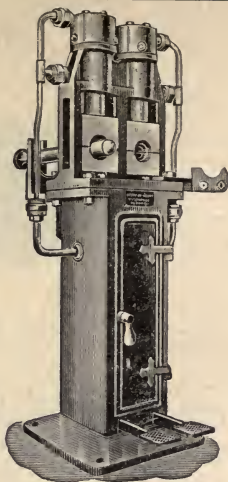


Fig. D. 515.

Double Cylinder Flue Welder.

Double Cylinder Pneumatic Flue Welder, fitted with dies and mandrel for welding and swedging any one size flue.....	\$375 00
Double Cylinder Pneumatic Flue Welder, fitted with dies and mandrels for welding and scarfing any one size flue.....	375 00
Double Cylinder Pneumatic Flue Welder, fitted with dies and mandrels for welding, swedging and scarfing any one size flue.....	400 00
Single Cylinder Pneumatic Flue Welder, fitted with dies and mandrel for welding any one size flue.....	300 00
Same, fitted with dies for swedging, or with dies and mandrels for scarfing any one size flue.....	300 00

Discount.....

Extra Dies and Mandrels for Welding Flues.

2 in.	2½ in.	2½ in.	2¾ in.	3 in.	3½ in.	3½ in.	4 in.	4½ in.
\$31 00	\$31 00	\$31 00	\$32 50	\$32 50	\$35 00	\$35 00	\$36 00	\$37 00

Extra Dies for Swedging Flues.

2 in.	2½ in.	2½ in.	2¾ in.	3 in.	3½ in.	3½ in.	4 in.	4½ in.
\$25 00	\$25 00	\$25 00	\$26 00	\$26 00	\$27 00	\$27 00	\$28 00	\$28 50

Extra Dies and Mandrels for Scarfing Flues.

2 in.	2½ in.	2½ in.	2¾ in.	3 in.	3½ in.	3½ in.	4 in.	4½ in.
\$31 00	\$31 00	\$31 00	\$31 00	\$35 00	\$35 00	35 00	\$36 00	\$36 00

Discount.....

2 in. to 2½ in. flues can be scarfed with the same dies and mandrel.
 3 in. to 3½ in. flues can be scarfed with the same dies and mandrel
 4 in. flues can be scarfed with the same dies and mandrel.

GLASS TUBE CUTTERS.

"Jelco."



Fig. D. 516.

Equipped with parallel fibre rests, holding glass rigid while cut is made, making a perfect cut. The wheels are easily renewed.

Price..... each \$2.00
Extra Cutter Wheels.....per dozen 2.50

Discount.....

Chesterton.



Fig. D. 517.

In this cutter the sliding lever can be placed close to work, thus obtaining more power.

Price..... each \$2.00

Discount.....

Favorite.



Fig. D. 518.

Will cut glass tubes one quarter inch to five inches, and will cut a half-inch glass.

Price..... each \$0.50

Discount.....

GAUGE GLASS PRESERVERS.

Self-Packing.



Fig. D. 519.

$\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 inch, one dozen in a box, price per box..... \$0.60
1 and $1\frac{1}{4}$ inch, one-half dozen in a box, price per box..... .50

Discount.....

SCOTCH WATER GAUGE GLASSES.



Fig. D. 520.

Price, Per Dozen.

Length Inches.	External Diameter.			
	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 in.
10	\$ 3 00	\$ 3 60	\$ 5 04	\$ 6 12
11	3 24	3 96	5 64	6 72
12	3 60	4 32	6 12	7 32
13	3 84	4 80	6 60	7 92
14	4 20	5 16	7 08	8 52
15	4 44	5 52	7 56	9 12
16	4 80	5 88	8 16	9 72
17	5 04	6 24	8 64	10 32
18	5 40	6 60	9 12	10 92
19	5 64	7 08	9 60	11 52
20	6 00	7 44	10 20	12 12
22	6 60	8 16	11 16	13 44
24	7 20	8 88	12 12	14 64
30	9 00	11 16	15 24	18 24
36	10 80	13 44	18 24	21 96
48	14 52	18 00	24 36	29 16
60	18 12	22 56	30 48	36 48
72	21 84	27 12	36 48	43 80

60 x $1\frac{1}{4}$ inches, \$60.00.

Discount.....

Lengths not regular, charged the price of next longer tubes of same diameter.

SCOTCH LUBRICATOR GLASSES.

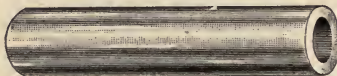


Fig. D. 521.

Length, Inches	External Diameter.		
	$\frac{1}{2}$	$\frac{3}{4}$	1
2	\$1 44	\$1 68	\$1 92
2 $\frac{1}{2}$	1 56	1 80	2 04
3	1 68	1 92	2 16
3 $\frac{1}{2}$	1 80	2 04	2 28
4	1 92	2 16	2 40
4 $\frac{1}{2}$	2 16	2 40	2 64
5	2 28	2 52	2 88
5 $\frac{1}{2}$	2 40	2 64	3 00
6	2 52	2 76	3 12

Discount.....

SCOTCH WATER GAUGE GLASS.

Moncrieff's "Unific."

These glasses will stand a steam pressure of 350 to 400 pounds, and have been put on the market on account of the steady rise in the working pressure of steam boilers during the last few years.

Length, Inches.	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$
10	\$ 3 48	\$ 4 56	\$ 5 64	\$ 7 32	\$ 9 12
11	3 84	4 92	6 24	7 92	10 08
12	4 20	5 52	6 72	8 52	10 92
13	4 56	5 88	7 20	9 24	11 88
14	4 92	6 36	7 80	9 96	12 72
15	5 28	6 84	8 28	10 68	13 68
16	5 64	7 32	8 88	11 40	14 64
17	6 00	7 68	9 48	12 12	15 48
18	6 36	8 16	10 08	12 72	16 44
19	6 72	8 64	10 56	13 44	17 40
20	7 08	9 12	11 16	14 16	18 24
21	7 44	9 48	11 64	14 88	19 20
22	7 80	10 08	12 24	15 60	20 04
23	8 16	10 44	12 72	16 32	21 00
24	8 52	10 92	13 32	17 04	21 84
30	10 50	13 80	16 80	21 30	27 30
36	12 60	16 56	20 16	25 56	32 76
48	16 80	22 08	26 88	34 08	43 68
60	21 00	27 60	33 60	42 60	54 60
72	25 20	33 12	40 32	51 12	65 52

We also carry in stock $1\frac{1}{4}$ x 72 and $1\frac{1}{2}$ x 72.

Discount.....

SCOTCH LUBRICATOR GLASSES.

Moncrieff's "Unific."

Will stand a steam pressure of 350 to 400 pounds.

Lgth. Ins.	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
2	\$1 56	\$1 80	\$2 16	\$2 76	\$3 36	\$4 92	\$5 52	\$ 6 72
2 $\frac{1}{2}$	1 68	2 04	2 40	3 00	3 72	5 16	5 76	7 32
3	1 80	2 16	2 52	3 48	4 20	5 16	5 76	7 32
3 $\frac{1}{2}$	2 04	2 28	2 76	3 72	4 56	5 76	6 72	8 52
4	2 16	2 40	3 00	4 08	5 04	5 76	6 72	8 52
4 $\frac{1}{2}$	2 28	2 64	3 12	4 32	5 40	6 72	7 56	9 72
5	2 40	2 76	3 36	4 68	5 76	6 72	7 56	9 72
5 $\frac{1}{2}$	2 64	3 00	3 60	5 04	6 24	7 56	8 52	10 92
6	2 76	3 12	3 72	5 28	6 60	7 56	8 52	10 92

Discount.....



Fig. D. 522.
Model "Q C"
Quick Closing.

WATER GAUGES.

Bronze.

These gauges prevent scalding of fireman in case glass breaks.

Model "Q C" can be closed from a safe distance by simply pulling the chain.

Model "A C" closes automatically when glass breaks; automatic valve can be re-ground by hand and has renewable seat.

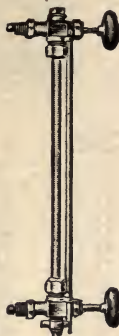


Fig. D. 523.
Model "A C"
Automatic Closing.

Prices, Each.

Style Pattern.	Size Pipe Thread, Inches.	Glass. Inches.	Finished.	Nickel Plated.	Semi-Fin.
			Model "Q C" Finished Arm and Chain.		Arm and Chain.
			Model "A C" Wood Wheel.		Iron Wheel.
"Extra Heavy" for 350 lbs. W. P. ... (Square body)	$\frac{1}{2}$	$\frac{3}{4} \times 16$	\$12 00	\$14 00	\$11 00
"Medium" for 200 lbs. W. P. (Square or round body)...	$\frac{1}{2}$	$\frac{3}{4} \times 12$ $\frac{3}{4} \times 16$	9 00	11 00	8 00
"Double Extra Heavy" for 500 lbs. W. P. (Round body).....	$\frac{3}{4}$ 1	$\frac{3}{4} \times 16$	22 00	24 00	21 00
"Double Extra Heavy Marine" Flanged connection for 500 lbs. W. P. (Round body).....	Flanges $4\frac{1}{2} \times \frac{3}{4}$	$\frac{3}{4} \times 16$	34 00	36 00	33 00

Model "Q C"—12 feet of brass chain furnished with each gauge.

Discount.....

WATER GAUGES.

Brass.

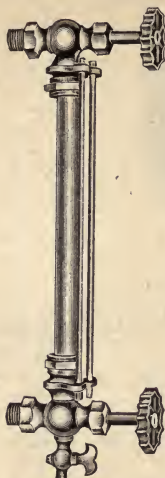


Fig. D. 524.
Iron Wheels,

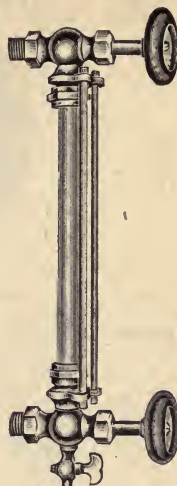


Fig. D. 525.
Wood Wheels,

	Size of Pipe, Inches.	Size of Glass, Inches.	Number of Guards.	Price.
No. 610*..... Finished Body.....	$\frac{1}{2}$	$\frac{1}{2} \times 16$	2	\$ 8 00
" 612*..... " "	$\frac{1}{2}$	$\frac{1}{2} \times 16$	4	10 00
" 620..... " "	$\frac{1}{2}$	$\frac{1}{2} \times 12$	2	5 50
" 624..... Rough Body.....	$\frac{1}{2}$	$\frac{1}{2} \times 12$	2	3 25
" 622*..... Finished Body.....	$\frac{1}{2}$	$\frac{1}{2} \times 12$	2	5 75

Discount.....

*Wood wheels. All others have iron wheels.

The No. 612 Gauge is so made that the glass can be replaced while under steam pressure.



Fig. D. 526.

WATER GAUGE GLASS GASKETS.

All sizes carried in stock, price, per lb.....

STEAM GAUGES.



Fig. D. 527.

Prices, Including Cocks, Each.

Single Spring Gauges.			Double Spring Locomotive Gauges.		
	Brass Case	Iron Case, Japanned		Brass Case	Iron Case, Japanned
12 inch dial.....	\$75 00	\$50 00	12 inch dial.....	\$80 00	\$55 00
10 " ".....	40 00	32 00	10 " ".....	45 00	37 00
8½ " ".....	30 00	22 00	8½ " ".....	34 00	25 00
6½ " ".....	20 00	16 00	6½ " ".....	22 00	18 00
6 " ".....	16 00	13 00	6 " ".....	18 00	15 00
5½ " ".....	12 00	10 00	5½ " ".....	14 00	12 00
5 " ".....	11 00	8 00	5 " ".....	13 00	11 00
4½ " ".....	10 00	8 00	4½ " ".....	12 00	10 00
3½ " ".....	9 00	7 00	Nickel Plating Extra.		
3 " or smaller.	8 00	6 00			

Discount.....

Discount.....

Test Gauges.
Brass Case.

10 inch dial.....	\$50 00	5½ inch dial.....	\$20 00
8½ " ".....	40 00	4½ " ".....	16 00
6½ " ".....	30 00	3½ " ".....	14 00
6 " ".....	25 00	3 " ".....	14 00

Discount.....

Hydraulic Gauges.

From 1,000 to 20,000 lbs. per square inch.
Brass Case and Ring. Iron Case, Brass Ring.

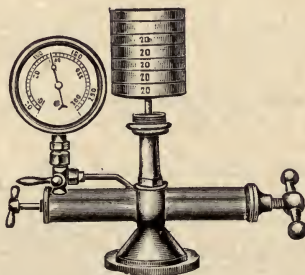
12 inch dial.....	\$125 00	12 inch dial.....	\$110 00
10 " ".....	100 00	10 " ".....	90 00
8½ " ".....	80 00	8½ " ".....	70 00
6½ " ".....	60 00	6½ " ".....	50 00
6 " ".....	40 00	6 " ".....	35 00

Discount.....

DUPLEX AIR GAUGE.**Ashcroft.****Fig. D. 528.**

5-inch dial.

Price, Brass Case each, \$20 00
 " Iron Case each, 16 00

*Discount.....***AMERICAN DEAD-WEIGHT GAUGE TESTER.****Fig. D. 529.**

No refilling or draining this Tester. A time and labor saver; absolutely correct.

Prices.

With Weights for...	200 lbs.	300 lbs.	500 lbs.	800 lbs.	1000 lbs.
Price, each.....	\$100 00	\$120 00	\$140 00	\$170 00	\$200 00

No Gauge furnished or necessary.

Discount.....

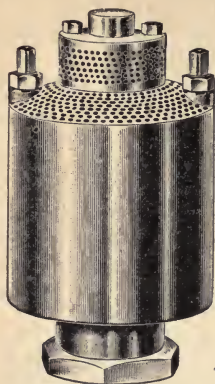


Fig. D. 530.
No. 30, Muffler.

SAFETY VALVES.

Ashton.

Particularly Designed
for
Locomotive
Service.

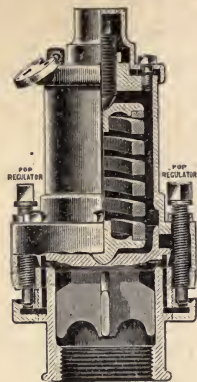


Fig. D. 531.
No. 28, Open Pop.

Inches.....		2½	3	3½
No. 30. Ashton Improved Muffler Valve.....	price,	\$88 00	\$97 00	\$100 00
No. 28. Ashton Open Pop Valve.....	"	48 00	58 00	68 00
No. 29. Ashton Cam Lever Valve.....	"	58 00	68 00	78 00

For Stationary, Portable Engine and Marine Boilers. Water Relief Valves for Fire Pumps, Etc.

Size	COMP. BODY	Inches	¾	1	1½	1½	2	2½	3
No. 6.	Open Discharge.....		\$4 50	6 50	8 50	10 00	20 00	32 00	40 00
No. 8.	Open Discharge Lever and Lock.....		6 00	8 00	10 00	12 00	22 00	34 00	48 00
No. 9.	Side Outlet Lever and Lock..		7 00	9 00	11 00	14 00	25 00	40 00	50 00
No. 15.	Marine Outlet Lever and Lock.....		7 20	9 60	12 00	14 40	25 00	40 00	55 00
No. 24.	Water, Side Outlet.....		7 00	9 00	12 50	16 50	23 00	40 00	65 00

Size	IRON BODY	Inches	2	2½	3	3½	4	4½	5
No. 3.	Side Outlet, Stationary.		\$30 00	40 00	55 00	64 00	70 00	80 00	85 00
No. 16.	Side Outlet, Marine....		38 00	48 00	66 00	75 00	84 00	95 00	102 00
No. 22.	Side Outlet, Water.....		40 00	60 00	75 00	80 00	85 00	105 00	125 00

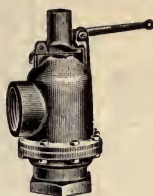
In ordering valves, always state the number of valve, and highest working pressure; also whether flange or screw end is required.

Discount.....

SAFETY VALVES.

Lonerган.

"Water Relief."

Fig. D. 532.
Model I.Fig. D. 533.
Model A.Fig. D. 534.
Model K.Fig. D. 535.
Model O.

Size, Inches.....	2	2½	3	3½	4	4½	5	5½	6
*Model "I," each.....	\$45 00	55 00	65 00	85 00	100 00	125 00	150 00	200 00	225 00
\$Model "A," each with Bronze seat.....	\$45 00	55 00	65 00	85 00	100 00	125 00	150 00	180 00	225 00
\$Model "A," each with Nickel seat.....	\$57 50	70 00	82 50	107 50	125 00	152 50	180 00	215 00	265 00
Nominal Horse Power.....	50	75	100	125	150	175	200	250	300

*For Pumps, Hydraulic Elevators, Pipe Lines, Water Works, etc. For working pressure to 300 pounds.

\$For Stationary Boilers. For working pressure to 200 pounds.

Size, Inches.....	½ or ¾	¾	1	1½	2	2½	3
Model "K," finished, each.....	\$10 00	10 00	12 00	15 00	20 00	30 00	50 00
Approx. Max. horsepower.....	6	8	10	20	30	40	75
Model "O," semi-finished, ea. \$ 9 00	10 00	10 00	12 00	15 00	20 00	30 00	50 00
Model "O," finished, each.....	10 00	12 00	15 00	18 50	25 00	36 50	58 50
Approx. Max. horsepower.....	1 to 3	4 to 6	10	20	30	40	75

Model "K," for Portable, Stationary, Marine, Hoisting, Farm and Traction Boilers.

Model "O," for Portable, Stationary and Marine Boilers.

In ordering any of above valves, state pressure at which valve is to blow off.

Discount.....

POP SAFETY VALVES.

"Encased Locomotive."

These valves designed expressly for very high steam pressures now carried on locomotives. Tested under steam.

Fig. D. 537, same as Fig. D. 536, but equipped with muffler attachment, which muffles the sound of steam escaping through valve.

List Price, Each.

Size Inches.	Model "X" Finished.	Model "Y" Finished.
1½	\$30 00	\$40 00
1½	35 00	50 00
2	45 00	65 00
2½	60 00	80 00
3	75 00	90 00

Bushings for dome cap furnished, if desired, without extra charge.

In ordering, state pressure at which valve is to blow off.

Discount.....

"Muffler Locomotive."

Fig. D. 536.
Model X.Fig. D. 537.
Model Y

THE HANCOCK INSPIRATOR.

"Stationary" Pattern

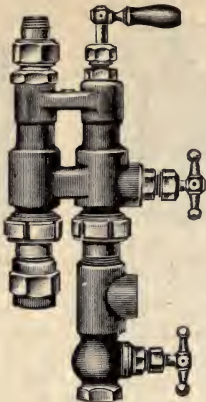


Fig. D. 538

Prices, Capacities and Pipe Connections.

Size.	Price.	*Capacity per hour.		Pipe Connections.			
		Steam Pressure 60 lbs.	Horse Power	Steam.	Suc-tion.	Deliv-ery.	Over-flow.
7½	\$ 16 00	60 gals.	5 to 8	½	½	½	½
8½	18 00	90 "	8 to 15	¾	¾	¾	¾
10	20 00	120 "	15 to 25	1	1	1	1
12½	25 00	220 "	25 to 35	1½	1½	1½	1½
15	30 00	300 "	35 to 60	2	2	2	2
17½	40 00	420 "	60 to 75	2½	2½	2½	2½
20	45 00	540 "	75 to 100	3	3	3	3
22½	55 00	720 "	100 to 130	1	1½	1½	1
25	60 00	900 "	130 to 175	1	1½	1½	1
30	75 00	1,260 "	175 to 235	1½	1½	1½	1½
35	90 00	1,740 "	235 to 300	1½	1½	1½	1½
40	110 00	2,230 "	300 to 400	1½	2	2	1½
45	125 00	2,820 "	400 to 500	1½	2	2	1½
50	150 00	3,480 "	500 to 650	2	2½	2½	2
55	175 00	3,650 "	650 to 700	2	2½	2½	2

*Capacities are *guaranteed* to be actual as listed with feed water at a temperature of 75° Fahrenheit on a 4-ft. lift.

Discount.....

METROPOLITAN AUTOMATIC INJECTOR.

Stationary Pattern.

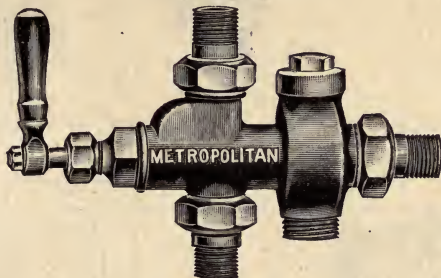


Fig. D. 539.

Model N.

Sizes.	Prices.	Size of Pipe Connections.			Capacity with Steam Pressure. 80 lbs. 2-foot Lift.	Horse Power.
		Steam.	Suction.	Delivery.		
2	\$ 15 00	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	60 gals.	4 to 6
3	16 00	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	80 "	6 " 8
3½	18 00	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	120 "	8 " 15
4	20 00	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	165 "	15 " 20
5	25 00	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	250 "	20 " 30
6	30 00	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	350 "	30 " 45
7	40 00	1	1	1	500 "	45 " 65
8	45 00	1	1	1	600 "	65 " 80
9	55 00	1½	1½	1½	800 "	80 " 100
10	60 00	1½	1½	1½	1000 "	100 " 130
11	75 00	1½	1½	1½	1300 "	130 " 170
12	90 00	1½	1½	1½	1750 "	170 " 230
13	110 00	2	2	2	2300 "	230 " 300
14	125 00	2	2	2	2850 "	300 " 375

The Metropolitan Automatic Injector is especially adapted for feeding stationary boilers. It is operated entirely by one handle and designed so that the tubes can be removed easily by an ordinary working wrench. It is absolutely automatic and instantly restarts should the feed be interrupted. These features commend this Injector for all places where it is not possible to have the usual facilities for repairing.

It can be used successfully with steam pressure from 25 lbs. to 140 lbs.

Discount.....

THE HANCOCK "EJECTOR" OR JET PUMP.

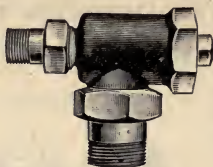


Fig. D. 540.

Size.	Capacity Per Hour. Steam Pressure 60 Pounds.	Pipe Connections.		Price.
		Steam.	Suction and Delivery.	
No. 1 Brass.	244 gals.	$\frac{1}{4}$ -inch.	$\frac{1}{4}$ -inch.	\$ 8 00
" 2 "	550 "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	10 00
" 3 "	977 "	$\frac{1}{4}$ "	1 "	15 00
" 4 "	1,525 "	$\frac{1}{4}$ "	$1\frac{1}{4}$ "	20 00
" 5 Iron.	2,200 "	$\frac{1}{4}$ "	$1\frac{1}{2}$ "	25 00
" 6 "	3,900 "	1 "	2 "	35 00
" 7 "	6,000 "	$1\frac{1}{4}$ "	$2\frac{1}{2}$ "	45 00
" 8 "	8,800 "	$1\frac{1}{2}$ "	3 "	55 00
" 9 "	15,600 "	2 "	4 "	70 00
" 10 "	24,300 "	$2\frac{1}{2}$ "	5 "	110 00
" 11 "	35,000 "	$2\frac{3}{4}$ "	6 "	160 00

Discount.....

INJECTORS.

Penberthy.

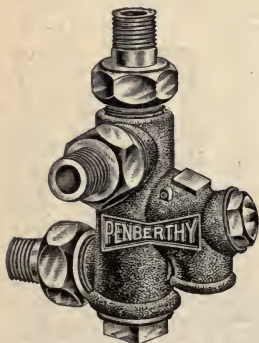


Fig. D. 541.

Sizes.	Price.	Horse Power.	Pipe Connect'ns. Inches.	Gals. Per Hour.
O	\$ 15 00	3 to 6	$\frac{1}{4}$	60
OO	16 00	4 to 8	$\frac{1}{4}$	80
A	18 00	8 to 16	$\frac{1}{4}$	135
AA	20 00	12 to 22	$\frac{1}{4}$	180
B	25 00	17 to 32	$\frac{1}{4}$	260
BB	30 00	20 to 45	$\frac{1}{4}$	355
C	40 00	40 to 65	1	475
CC	45 00	45 to 80	1	600
D	55 00	50 to 100	$1\frac{1}{4}$	800
DD	60 00	75 to 135	$1\frac{1}{4}$	1,000
E	75 00	100 to 180	$1\frac{1}{2}$	1,400
EE	90 00	115 to 255	$1\frac{1}{2}$	1,900
F	110 00	160 to 320	2	2,400
FF	125 00	200 to 400	2	3,000
G	150 00	300 to 500	$2\frac{1}{2}$	3,600
GG	200 00	375 to 600	$2\frac{1}{2}$	4,200

Discount.....

LOCOMOTIVE TRIP GONGS.

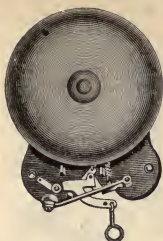
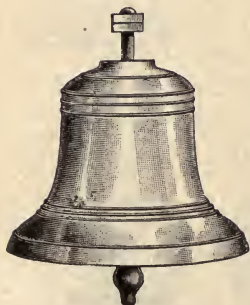


Fig. D. 542.

Diameter.	Price, Each.
4 inch.....	\$ 1 25
5 ".....	1 50
6 ".....	2 00
7 ".....	3 75
8 ".....	4 00
10 ".....	7 00
12 ".....	12 50
14 ".....	18 00

Discount.....

Fig. D. 543.
With Clapper and Bolts.

BELLS.

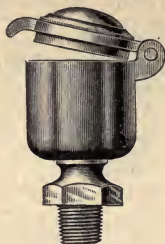
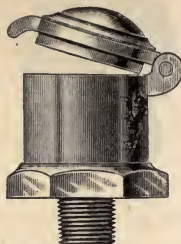
For
Locomotives,
Steamships,
Etc.

Fig. D. 544.
With Handle Complete.

Diameter, Bell.	Weight.	Price, Each.	Diameter, Bell.	Weight, Bell Only.	Price, Each.
10½ inch	20 lbs.	\$ 9 00	11 inch	30 lbs.	\$22 50
11 ".....	25 ".....	11 25	13 ".....	40 ".....	28 00
12 ".....	30 ".....	13 50	14 ".....	50 ".....	35 00
12½ ".....	35 ".....	15 75	15 ".....	60 ".....	43 75
13 ".....	40 ".....	18 00	15½ ".....	70 ".....	52 50
14 ".....	50 ".....	22 50	16½ ".....	80 ".....	62 50
15 ".....	60 ".....	27 00	17½ ".....	100 ".....	75 00
16 ".....	70 ".....	31 50			
17 ".....	80 ".....	36 00			

Discount.....

OIL CUPS.

Fig. D. 545.
Plain Brass.Fig. D. 545-1.
Hinged Cover.
Plain Brass.Fig. D. 545-2.
Hinged Cover.

Diameter, in...	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Pipe thread, in.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
Price, each....	\$0 25	30	35	40	60	90	1 25	1 75	2 75	4 50

Sizes 1 $\frac{1}{2}$ in. and larger have center tubes.

Hinged Cover—Finished Brass.

Number.....	1	2	3	4	5	6	7
Outside Diam., inches.....	$\frac{7}{8}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2
Shank Pipe Thread, inches.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Price, each.....	\$0 70	85	1 20	1 60	2 10	2 50	2 70

Discount.....

Fig. D. 546.
Sight Feed.

Glass.
Lever.

Fig. D. 547.
Plain.

Number.....	0	1	1 $\frac{1}{2}$	2	3	4	5	6
Outside Diameter, inches.....	1 $\frac{1}{2}$	2 $\frac{1}{8}$	2 $\frac{3}{16}$	2 $\frac{1}{2}$	2 $\frac{13}{16}$	2 $\frac{13}{16}$	3 $\frac{1}{8}$	3 $\frac{13}{16}$
Diameter of Glass, inches.....	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$
Height of Glass, inches.....	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	4
Capacity, ounces.....	1	1	1 $\frac{1}{2}$	2 $\frac{1}{2}$	4	5	10	18
Shank Pipe Thread, inch.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Finished Brass, Fig. D. 546....	\$3 00	\$3 25	\$3 50	\$3 75	\$4 25	\$5 25	\$7 25	\$9 25
Nickel Plated, Fig. D. 546....	3 50	3 75	4 00	4 25	4 75	5 75	8 00	10 25
Finished Brass, Fig. D. 547....	2 75	2 95	3 20	3 40	3 85	4 85	6 75	8 75
Nickel Plated, Fig. D. 547....	3 25	3 45	3 70	3 90	4 35	5 30	7 50	9 75

Discount.....

Fig. D. 548.
Automatic.

GREASE CUPS.

Diam. of Body, Inches.	Shank, Iron Pipe, Thread.	Automatic.		Plain.	
		Cap'y Grease.	Price Each.	Cap'y Grease.	Price Each.
1 $\frac{1}{4}$	$\frac{1}{4}$ inch.	1 oz.	\$2 00	$\frac{1}{4}$ oz.	\$0 90
1 $\frac{1}{2}$	"	1 $\frac{1}{2}$ "	2 50	1 "	1 15
2	"	3 "	3 20	2 "	1 50
2 $\frac{1}{2}$	"	4 $\frac{1}{2}$ "	4 30	3 $\frac{1}{2}$ "	2 15
3	"	6 $\frac{1}{2}$ "	6 00	.....	.....

Fig. D. 549.
Plain

Discount.....

ENGINE LUBRICATORS.

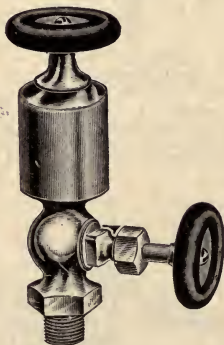
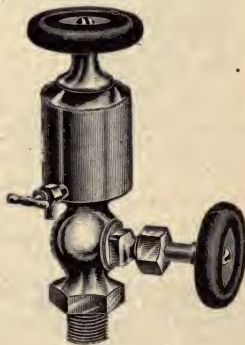


Fig. D. 550.

Fig. D. 551.
With Air Cock and Tube.

The Fig. D. 551 Lubricator is so constructed that the flow of oil is regulated by condensation (it feeds as it condenses), which is a very important feature. The result of this slow feed is that it takes hours for the oil to pass through, instead of it running out in a short time. We would therefore recommend consumers to use the Lubricator with Air Cock and Tube.

Diameter of Body, inches.....	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Shank, Iron Pipe Thread.....	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
No. D. 550, each.....	\$2 00	2 20	2 40	2 60	2 80
No. D. 551, with Air Cock and Tube, ea.....		\$3 20	3 40	3 60	3 90
Diameter of Body, inches.....	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3	3 $\frac{1}{2}$	4
Shank, Iron Pipe Thread.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
No. D. 550, each.....	\$3 25	3 75	4 75	7 00	10 00
No. D. 551, with Air Cock and Tube, ea.....	\$4 25	4 75	5 75	8 00	11 00

Discount.....

LUBRICATORS.

Detroit.

Improved Standard.

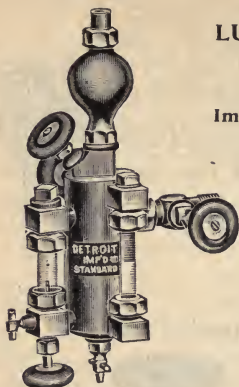


Fig. D. 552.
Double Connection.

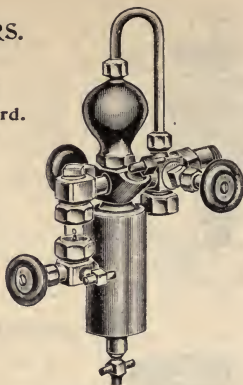


Fig. D. 553.
Single Connection.
Style C.

The heating passage from the upper sight-feed arm to the support arm passes directly through the body of the Lubricator, and, being always filled with steam, it keeps the oil constantly warm and in a thoroughly liquid condition. This Lubricator is particularly well adapted for feeding heavy oils.

Prices, Fig. D. 552.

Size.....	$\frac{1}{2}$ pt.	$\frac{1}{2}$ pt.	1 pt.	1 qt.	$\frac{1}{2}$ gal.	1 gal.
For Cylinder.....	Under 10 inches.	10 to 12 inches.	12 to 18 inches.	18 to 30 inches.	30 inch. and over.	
Brass Finish.....	\$17 00	\$22 00	\$30 00	\$45 00	\$60 00	\$75 00
Nickel Finish.....	20 00	25 00	35 00	50 00	65 00	80 00
Pipe Thread on Support Arm ...inch.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

For Traction or Portable Engines, Steam Pumps, Etc.

This is an extra strong and durable Lubricator and it can be connected to the steam pipe either above or below the throttle or into the steam chest direct. It cannot be siphoned out and will not vary in feed whether the engine is working hard or running light.

The one pint and one quart sizes of this Lubricator have a gauge as well as a sight-feed glass.

Prices, Fig. D. 553.

Size.....	$\frac{1}{2}$ pt.	$\frac{1}{2}$ pt.	$\frac{1}{2}$ pt.	1 pt.	1 qt.
Brass Finish.....each	\$15 00	\$17 00	\$20 00	\$28 00	\$42 00
Nickel Plated.....each	18 00	20 00	23 00	32 00	47 00
Pipe Thread on Support Arm ...inch.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

Discount.....

LUBRICATORS.

Detroit "Zero."

For traction engines, for engines working in exposed places and for steam pumps, etc.

The oil is kept warm by steam automatically.

The oil cannot chill while boiler is producing steam.

Capacity.	Pipe Thread.		Price, Each.	
	Single Conn.	Double Conn.	Bronze Body.*	Nickel Plated.
$\frac{1}{2}$ Pint....	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	\$15 00	\$18 00
$\frac{3}{4}$ "	$\frac{1}{4}$ " "	$\frac{3}{8}$ " "	17 00	20 00
1 "	$\frac{1}{4}$ " "	$\frac{3}{8}$ " "	20 00	23 00
1 Quart....	$\frac{1}{4}$ " "	$\frac{3}{8}$ " "	28 00	32 00
			42 00	47 00

*Bronzed bodies have finished trimmings.

Discount.....

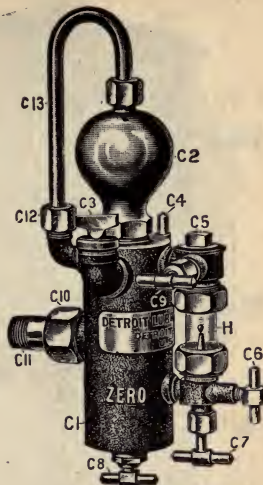


Fig. D. 554.

GLASS BODY OIL PUMP.

Lever Handle.

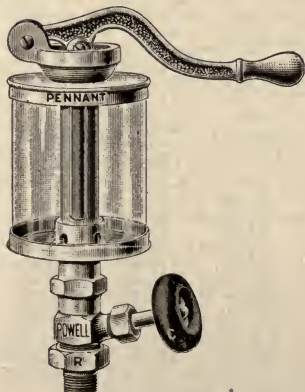


Fig. D. 555.

Union shank connection, obviating the necessity of dismantling the pump to get it in place owing to cramped space in which to turn it.

Numbers.....	1	1½	2	3
Outside Diameter of Glass.....	2½ in.	3 in.	3½ in.	4½ in.
Height of Glass..	2½ "	3 "	4 "	5 "
Capacity.....	$\frac{1}{4}$ pt.	$\frac{1}{2}$ pt.	1 pt.	1 qt.
Shank Pipe Thread.	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Price, each, Polished.....	\$7 50	8 50	10 00	15 00
Price, each, Nickel Plated..	8 00	9 50	11 00	16 50
Price, each, Extra Glasses..	15	35	65	1 50

Discount.....

OIL FILTERS.—

The bottom chamber E is filled with pure, warm water, which is heated by means of a steam pipe (exhaust) passing through the filter. Very little steam is required, and if the filter is kept in a warm place, it will not be necessary to make steam connection at all.

The waste oil is poured in through top grating, A. It then passes into chamber B, through the layer of waste, which collects all the heavier impurities. From thence through the perforated bottom of chamber B, down in the direction shown by arrows into tube C, and from here onto filter plate D, where the increased weight of the water has a tendency to keep the oil back in tube C. However, the pressure of oil in chamber B forces it down and spreads it out over plate D, in a very thin film which constantly changes surface and grows thinner as it travels from the center to the circumference of plate D, thus exposing every particle of waste oil to the action of the water. It then flows upon plate 1D and 2D, going through the same process in each case. When the

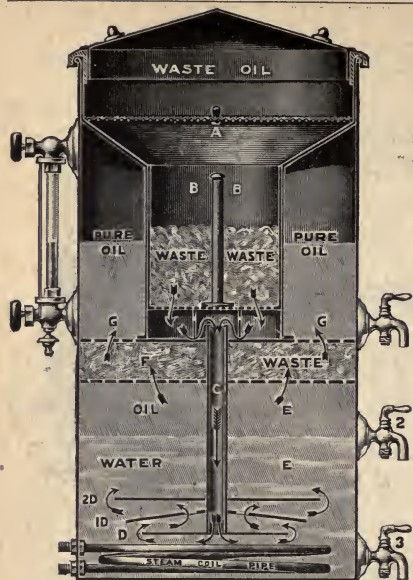


Fig. D. 556. Cross.

oil leaves the filter plate D" it is in a finely divided state of separation and thoroughly mixed with water, which washes it out and from which it separates by gravity all the remaining impurities, which settle in chamber E, and can be removed through cock No. 3. From plate D" the oil again filters through the stratum of filtering material F, and from there to chamber G, the reservoir containing the purified oil. It is then drawn off as required from cock No. 1.

Size.	Filtering Capacity Per Day of 24 Hours, Gallons.	Diameter Inches.	Height, Inches.	Price American Oil Filters.	Price Cross Oil Filters.	Price Cross A Oil Filters.	Price Cross B Oil Filters.
No. 1	15 to 20	18	30	\$ 29 50	\$ 29 50	\$ 35 00	\$ 40 00
No. 2	3 to 5	12	26	19 50	19 50	....	25 00
No. 3	30 to 40	24	36	60 00	60 00	65 00	70 00
No. 4	50 to 60	30	54	75 00	75 00	80 00	90 00
No. 5	70 to 90	33	56	90 00	90 00	95 00	110 00
No. 6	100 to 120	35	60	110 00	110 00	110 00	130 00
No. 7	120 to 150	35	74	130 00	130 00	130 00	150 00
No. 8	150 to 200	40	76	165 00	165 00	165 00	180 00
No. 9	200 to 250	44	80	200 00	200 00	200 00	225 00
No. 10	250 to 300	48	86	250 00	250 00	250 00	275 00
No. 11	300 to 400	52	92	300 00	300 00	300 00	350 00
No. 12	400 to 500	56	98	350 00	350 00	350 00	400 00

Cross A Filters for oiling systems.

Cross B Filters automatically separates the water from waste oil.

No additional charge for American Filters for use with gas or gasoline engines.

OIL FILTERS.

"Unit Type."

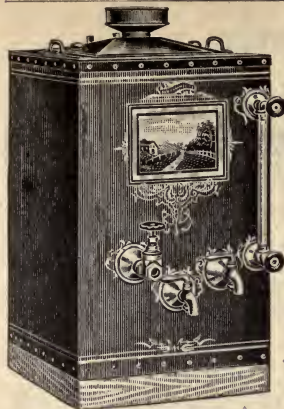


Fig. D. 557.
Exterior View No. 10.

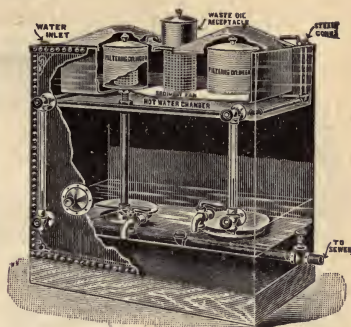


Fig. D. 558.
Sectional View No. 15.

The No. 10 Unit occupies a very limited space, yet has a filtering capacity of from 100 to 150 gallons per twenty-four hours. The No. 10 has one filtering tube instead of two, as in the No. 15. The principle of filtration is just exactly the same, and claims we make for the No. 15 will apply equally as well to the No. 10.

Filter can be used with or without an oiling system, the same as No. 15.

Where water is mixed with the waste oil we can furnish a water separating device which will automatically separate the water from the oil. The water will flow directly into the sewer and the oil passes into the filter. This attachment is placed in the upper part of the filter and takes the place of the oil receptacle. We charge \$17.50 extra for this attachment and where desired we can furnish same separate as it can be operated with or without a filter. Blue print will be furnished upon request.

The Unit can be operated either with or without an oiling system, and any kind of filtering material can be used in same. The hot water chamber at the top greatly facilitates the filtering of the oil. Blue print will be furnished upon request.

We are also in a position to furnish Unit filters of any capacity desired. In the construction of these large filters we use tank iron for the body, the seams being riveted and calked.

Size Number	10	15	16	17	18
Number of Units	1	1	2	3	4
Filtering capacity per day, gallons . .	100 to 150	200 to 250	400 to 500	600 to 750	800 to 1000
Capacity of Pure Oil Chamber, gallons . . .	50	90	180	270	360
Capacity of Waste Oil Chamber, gals. . .	10	20	40	60	80
Capacity of Water Chamber, gallons . . .	11	40	80	120	160
Length, inches	24	42	84	126	168
Width, inches	24	28	28	28	28
Height, inches	36	36	36	36	36
Price, each	\$80 00	120 00	240 00	360 00	480 00

Discount

RATCHET DRILLS.
Parker's.



Fig. D. 560. For Boiler Makers' Use.

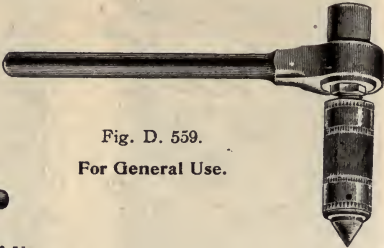


Fig. D. 559.
For General Use.

Nos.....	4	5	6	6½	7	8	9
Length of Handle.....Inches	10	12	15	17	20	10	12
General Use.....	\$5 75	6 00	7 00	7 50	8 00	5 50	6 00
Boiler Makers'.....							

Discount.....
Packer's.



Fig. D. 562. For Boiler Makers' Use.
Take Square Shank Drills only.

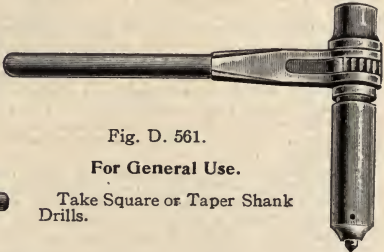


Fig. D. 561.
For General Use.
Take Square or Taper Shank
Drills.

Nos.....	1	2	3	4	5
Length of Handle.....Inches	10	12	16	18	24
General Use. (For Square Shanks)...	\$10 50	13 50	16 00	19 00	23 00
Boiler Makers'.....	9 00	10 50			

Discount.....

With Taper Hole for Twist Drills.

No. 1, 10 in. handle takes No. 1 Morse Taper Socket	\$13 00
" 2, 13 " " " 2 " " "	16 00
" 3, 16 " " " 3 " " "	20 00
" 4, 18 " " " 4 " " "	25 00

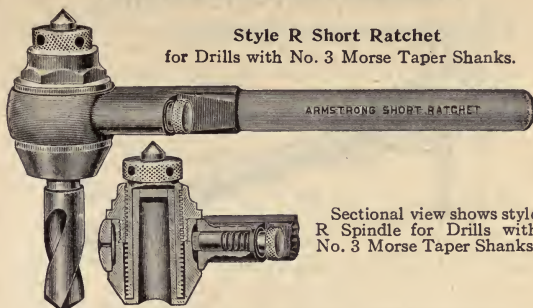
Discount.....

RATCHET DRILLS.

Armstrong Short Ratchet.

Short Head—Long Feed—Reversible.

Style R Short Ratchet
for Drills with No. 3 Morse Taper Shanks.



Sectional view shows style R Spindle for Drills with No. 3 Morse Taper Shanks.

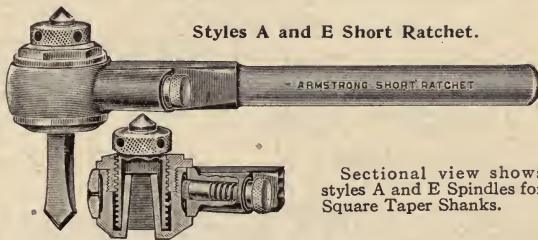
Fig. D. 563.

The sectional views show clearly the construction which is simple, compact and strong. All parts are made from drop forgings or bar steel. Pawl and center are tool steel, carefully tempered. It is self-discharging and can be reversed instantly. Each ratchet is packed in a cardboard box.

No.	Length.	Length Head.	Feed.	Price.	No.	Length.	Length Head.	Feed.	Price.
2	12 in.	3½ in.	2½ in.	\$ 8 00	3	18 in.	3½ in.	2½ in.	\$10 00

Discount.....

Styles A and E Short Ratchet.



Sectional view shows styles A and E Spindles for Square Taper Shanks.

Fig. D. 564.

Style A for Drills with No. 1 Taper Square Shanks.

Style E for Drills with No. 2 Taper Square Shanks.

Its short head, strength, compactness and quick reverse make it a perfect boiler ratchet.

No.	Length.	Length Head.	Feed.	Price.	No.	Length.	Length Head.	Feed.	Price.
2	12 in.	2½ in.	1½ in.	\$ 8 00	3	18 in.	2½ in.	1½ in.	\$10 00

Extras.—Extra Spindles, Styles A, E or R, with Nut and Feed Screw, each \$3.50. Style R, A and E Spindles are interchangeable.

Discount.....

When ordering be careful to specify style Spindle wanted.

By means of Sleeves and Sockets style R Spindles can be made to take drills with Nos. 1 and 2 Morse Taper Shanks and Drills with square Taper Shanks.

UNIVERSAL RATCHET DRILL.



Fig. D. 565.

Especially Adapted to Drilling Holes in Cramped Places.

The Armstrong Universal Ratchet will drive a drill in any position where it is possible to move the handle either in a vertical or horizontal direction or at any intermediate angle.

It has no ball joints, bevel gears or other complicated parts.

For ordinary work the handle can be rigidly fixed, almost instantly.

Two inches of motion at end of handle in any direction will drive the drill.

No.	Length.	Feed.	Price, Complete With One Spindle.	Extra Spindles, Each.
4	12 inches	1½ inches	\$12 00	\$2 40
6	18 inches	2¼ inches	18 00	3 60

Discount.....

Spindles Furnished.

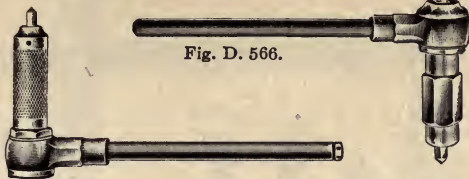
Style.	Fitting Ratchet.	Taking Drills.
M	No. 4	With No. 1 Square Taper Shanks
K	No. 4	" No. 2 Morse " "
F	No. 6	" No. 2 Square " "
N	No. 6	" No. 3 Morse " "
S	No. 6	" No. 4 Morse " "

NOTE.—When ordering be careful to specify style spindle wanted. Unless otherwise specified we will ship No. 4 Ratchet equipped with M spindle and No. 6 equipped with F spindle.

Regular Morse taper reducing sockets can be used in K, N and S spindles.

RATCHET DRILLS.

Keystone Reversible and Monarch Single Acting.



Keystone.

Fig. D. 567.

Monarch

Keystone, for Square Shank Drills.

No. 1,	10-inch handle	\$5 00
" 2,	14 " "	5 75
" 3,	16 " "	6 50
" 4,	18 " "	7 25
" 5,	22 " "	7 50
" 6,	24 " "	7 75
" 7,	28 " "	8 25

Keystone, for Morse Taper.

No.	21,	10-inch handle.	Keystone, for Morse Paper.	\$5 25
"	22,	14 "	" "	6 00
"	23,	16 "	" "	6 75
"	24,	18 "	" "	7 50
"	25,	22 "	" "	7 75
"	26,	24 "	" "	8 00
"	27,	28 "	" "	8 50

Keystone Combination No. 200.

Consisting of Morse Taper Ratchet for Twist Drills, Sleeve for Square Shank Drills, and Short Boiler Socket for Square Shank Drills.
(Sockets Interchangeable.)

No.	51.	Combination complete with	10-inch handle.....	\$ 7 75
"	52,	"	14 " "	9 00
"	53,	"	16 " "	10 00
"	54,	"	18 " "	11 25
"	55,	"	22 " "	11 50
"	56,	"	24 " "	11 75
"	57,	"	28 " "	12 25

Monarch, for Square Sleeve.

No. 10,	Square	Sleeve	Ratchet,	10-in. handle	\$ 5 00
20,	"	"	"	12 "	5 50
30,	"	"	"	15 "	6 00
40,	"	"	"	18 "	7 50
50,	"	"	"	22 "	8 50
60,	"	"	"	24 "	9 00
70,	"	"	"	28 "	10 00

Monarch, for Morse Taper.

No. 110,	Morse Taper Ratchet,	10-inch handle	.....	\$ 5 25
" 120,	"	12	" "	5 75
" 130,	"	15	" "	6 25
" 140,	"	18	" "	7 75
" 150,	"	22	" "	8 75
" 160,	"	24	" "	9 25
" 170,	"	28	" "	10 25

Discount.....

RATCHET DRILLS. Renshaw.

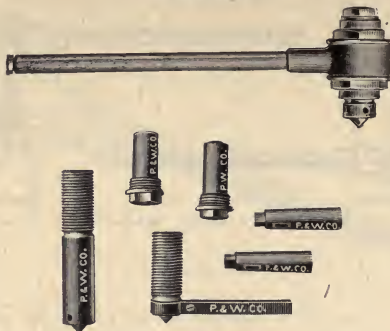


Fig. D. 568.

These tools are made in two sizes—No. 1 taking drills to $\frac{1}{2}$ -inch, No. 3 taking drills to $1\frac{1}{2}$ inches. All the parts are made from steel and hardened.

No. 1 has one collet for drills, with shank $\frac{1}{4}$ -inch square at shoulder, and one collet for drills fitting No. 1 Morse's standard taper socket.

No. 3 has one collet, No. 5, for drills, with shank $\frac{1}{2}$ -inch square at shoulder, of $\frac{1}{2}$ to $1\frac{1}{2}$ inches diameter, which are the extreme sizes that this ratchet is adapted to carry, and collets Nos. 1, 2 and 3, for Morse's standard taper shanks. No. 3 and No. 5 collets are held in the spindle by screw thread. No. 1 and No. 2 collets are tapered externally to fit No. 3 socket.

	No. 1	No. 3
Length of handle over all	9 $\frac{1}{2}$ in.	18 in.
Depth from top feed screw to bottom of collet	3 in.	5 in.
Full depth of feed	1 $\frac{1}{2}$ in.	2 $\frac{1}{2}$ in.
No. 1 ratchet drill complete, with two collets		\$11 00
No. 1 ratchet drill, with one collet		9 40
No. 1 collet, with square or taper hole, each		1 60
No. 1 or No. 2 collet for No. 3 ratchet, each		1 10
No. 1 ratchet body, each		2 20
No. 1 ratchet body nut, each		40
No. 1 feed screw, each		2 00
No. 1 feed pin, each		30
No. 1 ratchet handle, each		3 00
No. 1 pawl and spring, each		40
No. 3 ratchet drill complete, with four collets		15 00
No. 3 ratchet drill, with No. 3 or No. 5 collet only		11 05
No. 3 ratchet drill, with Nos. 1, 2 and 3 collets only		13 25
No. 3 or No. 5 collet for No. 3 ratchet, each		1 75
No. 3 ratchet body, each		3 00
No. 3 ratchet body nut, each		50
No. 3 feed screw, each		3 00
No. 3 extension feed screw, each		3 50
No. 3 feed pin, each		75
No. 3 ratchet handle each		4 75
No. 3 pawl and spring, each		50
No. 3 friction feed attachment		3 00

We also carry in stock collets for No. 3 Renshaw ratchet for taper square-shank drills, $\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2}$ inches long, also $\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2}$ inches long. Price, each, \$1.75.

Discount

WESTON'S DIFFERENTIAL RATCHET DRILLS.

For Square Shank Drills Only.



Fig. D. 569.
Style "B."
For Boiler Makers' Use.



Fig. D. 569-1.
Style "A."
For General Use.

Length of Handle, Inches	12	14	16	18	20	22
General Use	\$ 7 60	\$ 8 00	\$ 8 75	\$10 00	\$10 50	\$12 00
Boiler Makers'		8 00				

Discount

DRILLING POSTS.

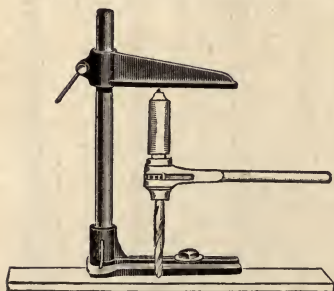


Fig. D. 570.
"Old Man."

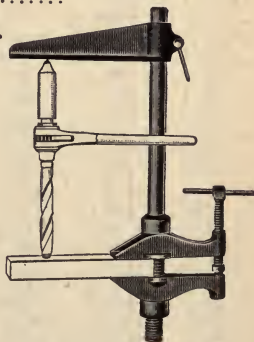


Fig. D. 571.
Double Jaw.

No.	Height of Post.	Radius of Arm.	Weight, Lbs.	Price, Each.	No.	Drill Holes up to	Radius of Arm.	Weight, Lbs.	Price, Each.
1	20 in.	10 in.	20	\$ 8 00	1	$\frac{3}{4}$ in.	10 in.	25	\$ 8 00
2	26 in.	12 in.	27	10 00	2	1 $\frac{1}{2}$ in.	12 in.	33	10 00

Fig. D. 571.—The jaws of both sizes open 4 inches. Can be made special to open any distance. The screws are made of tool steel and tempered. The screw in the lower jaw has a cup-shaped head, a guide and seat for top screw. The screws can be reversed. No. 2 is extra strong. Post is long enough to take No. 5 ratchet.

Discount

NOTE.—Prices do not include ratchets.

ENGINEERS' WRENCHES.

15° Angle, Single Head.

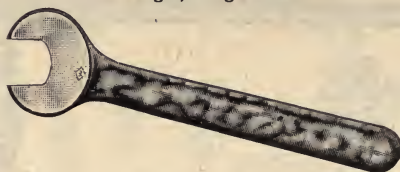


Fig. D. 572.

When ordering please advise if wrenches are to be finished, semi-finished or unfinished.

Number.	For U. S. Standard Nuts, Size Bolts.	Openings Milled.	Extreme Length.	PRICE, EACH.		
				Un-finished.	Semi-finished.	Finished.
00	$\frac{1}{8}$	$\frac{1}{8}$	$2\frac{1}{2}$	\$ 0 08	\$ 0 12	\$ 0 16
0	$\frac{1}{8}$	$\frac{1}{8}$	$2\frac{1}{2}$	09	13	18
1	$\frac{1}{8}$	$\frac{1}{8}$	$3\frac{1}{2}$	10	15	20
2	$\frac{1}{8}$	$\frac{1}{8}$	$4\frac{3}{4}$	12	18	24
3	$\frac{1}{8}$	$\frac{1}{8}$	$5\frac{1}{2}$	14	21	28
4	$\frac{1}{8}$	$\frac{1}{8}$	$6\frac{1}{2}$	17	25	34
5	$\frac{1}{8}$	$\frac{1}{8}$	$7\frac{1}{2}$	20	30	40
6	$\frac{1}{8}$	$\frac{1}{8}$	$8\frac{1}{2}$	26	39	52
7	$\frac{1}{8}$	$1\frac{1}{8}$	$9\frac{1}{2}$	32	48	64
8	$\frac{1}{8}$	$1\frac{1}{8}$	$11\frac{1}{2}$	42	63	84
9	$\frac{1}{8}$	$1\frac{1}{8}$	13	58	87	1 16
10	$1\frac{1}{8}$	$1\frac{1}{8}$	$14\frac{1}{2}$	75	1 13	1 50
11	$1\frac{1}{8}$	$1\frac{1}{8}$	$16\frac{1}{2}$	1 00	1 50	2 00
12	$1\frac{1}{8}$	2	$18\frac{1}{2}$	1 25	1 88	2 50
13	$1\frac{1}{8}$	$2\frac{1}{8}$	20	1 62	2 43	3 24
14	$1\frac{1}{8}$	$2\frac{1}{8}$	22	2 00	3 00	4 00
15	$1\frac{1}{8}$	$2\frac{1}{8}$	24	2 50	3 75	5 00
16	$1\frac{1}{8}$	$2\frac{1}{8}$	$25\frac{1}{2}$	3 00	4 50	6 00
16 $\frac{1}{2}$	$1\frac{1}{8}$	$2\frac{1}{8}$	27	3 70	5 55	7 40
17	2	$3\frac{1}{8}$	$29\frac{1}{2}$	4 40	6 60	8 80
18	$2\frac{1}{8}$	$3\frac{1}{8}$	33	6 00	9 00	12 00
19	$2\frac{1}{8}$	$3\frac{1}{8}$	37	7 60	11 40	15 20
19 $\frac{1}{2}$	$2\frac{1}{8}$	$4\frac{1}{8}$	39	10 00	15 00	20 00
20	3	$4\frac{1}{8}$	41	13 00	19 50	26 00
20 $\frac{1}{2}$	$3\frac{1}{8}$	5	43	16 00	24 00	32 00
A21	$3\frac{1}{8}$	$5\frac{1}{8}$	45	22 00	33 00	44 00
A21 $\frac{1}{2}$	$3\frac{1}{8}$	$5\frac{1}{8}$	47	25 00	36 00	47 00
A21 $\frac{1}{2}$	4	$6\frac{1}{8}$	49	28 00	39 00	50 00
A22	$4\frac{1}{8}$	$6\frac{1}{8}$	51	40 00	60 00	80 00
A22 $\frac{1}{2}$	5	7 $\frac{1}{8}$	53	45 00	65 00	85 00

Discount.....

ENGINEERS' WRENCHES.

15° Angle Double Head.

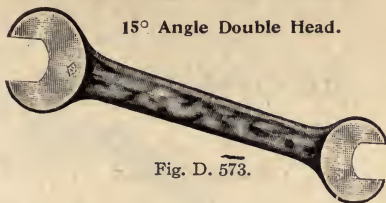


Fig. D. 573.

When ordering please state if wrenches are to be finished, semi-finished or unfinished.

Num-ber.	For U. S. Standard Nuts, Size Bolts.	Openings Milled.	Extreme Length.	PRICE, EACH.		
				Un-finished.	Semi-finished.	Finished.
21	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$3\frac{1}{2}$	\$ 12	\$ 18	\$ 24
22	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	4	13	20	26
23	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	4	14	21	28
24	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$4\frac{1}{2}$	16	24	32
25	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$4\frac{1}{2}$	18	27	36
26	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	5	20	30	40
27	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$5\frac{1}{2}$	22	33	44
28	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$6\frac{1}{2}$	24	36	48
29	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	6	26	39	52
30	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$7\frac{1}{2}$	28	42	56
31	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$7\frac{1}{2}$	30	45	60
32	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$8\frac{1}{2}$	32	48	64
33	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	$8\frac{1}{2}$	36	54	72
34	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $1\frac{1}{8}$	$9\frac{1}{2}$	40	60	80
35	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $1\frac{1}{8}$	$9\frac{1}{2}$	44	66	88
36	$\frac{1}{8}$ and $\frac{1}{8}$	$\frac{1}{8}$ and $1\frac{1}{8}$	$11\frac{1}{2}$	51	77	1 02
37	$\frac{1}{8}$ and $\frac{1}{8}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	$11\frac{1}{2}$	58	87	1 16
38	$\frac{1}{8}$ and $\frac{1}{8}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	$13\frac{1}{2}$	65	98	1 30
39	$\frac{1}{8}$ and $\frac{1}{8}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	$13\frac{1}{2}$	76	1 14	1 52
40	$\frac{1}{8}$ and 1	$1\frac{1}{8}$ and $1\frac{1}{8}$	$15\frac{1}{2}$	88	1 32	1 76
41	$\frac{1}{8}$ and 1	$1\frac{1}{8}$ and $1\frac{1}{8}$	$15\frac{1}{2}$	1 00	1 50	2 00
42	$\frac{1}{8}$ and $1\frac{1}{8}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	17	1 18	1 77	2 36
43	1 and $1\frac{1}{8}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	17	1 36	2 04	2 72
44	1 and $1\frac{1}{8}$	1 and 2	19	1 55	2 33	3 10
45	$1\frac{1}{8}$ and $1\frac{1}{8}$	$1\frac{1}{8}$ and 2	19	1 80	2 70	3 60
46	$1\frac{1}{8}$ and $1\frac{1}{8}$	$1\frac{1}{8}$ and $2\frac{1}{8}$	21	2 05	3 08	4 10
47	$1\frac{1}{8}$ and $1\frac{1}{8}$	2 and $2\frac{1}{8}$	21	2 30	3 45	4 60
48	$1\frac{1}{8}$ and $1\frac{1}{8}$	2 and $2\frac{1}{8}$	23	2 65	3 98	5 30
49	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	23	3 00	4 50	6 00
50	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	25	3 35	5 03	6 70
51	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	25	3 80	5 70	7 60
52	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	27	4 25	6 38	8 50
53	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	27	4 70	7 05	9 40
53 $\frac{1}{2}$	$1\frac{1}{8}$ and $1\frac{1}{8}$	$2\frac{1}{8}$ and $2\frac{1}{8}$	29	5 30	7 95	10 60
54	$1\frac{1}{8}$ and 2	$2\frac{1}{8}$ and $3\frac{1}{8}$	31	5 90	8 85	11 80
55	$1\frac{1}{8}$ and 2	$2\frac{1}{8}$ and $3\frac{1}{8}$	32	6 50	9 75	13 00
55 $\frac{1}{2}$	$1\frac{1}{8}$ and 2	$2\frac{1}{8}$ and $3\frac{1}{8}$	33	7 35	11 03	14 70
56	$1\frac{1}{8}$ and $2\frac{1}{8}$	$2\frac{1}{8}$ and $3\frac{1}{8}$	34	8 20	12 30	16 40
56 $\frac{1}{2}$	$1\frac{1}{8}$ and $2\frac{1}{8}$	$2\frac{1}{8}$ and $3\frac{1}{8}$	35	9 05	13 58	18 10
57	2 and $2\frac{1}{8}$	$3\frac{1}{8}$ and $3\frac{1}{8}$	36	10 25	15 38	20 50

Discount.

STRUCTURAL WRENCHES.

Straight Opening.

Fig. D. 574 $\frac{1}{2}$

The tang is for bringing bolt-holes into line and for insertion into convenient openings when wrench is not in use, preventing loss and keeping tool in sight.

These wrenches in the semi-finished condition are case-hardened all over, but heads are not ground.

Number.	For U. S. Standard Nut; Size Bolt.	Opening.	Extreme Length.	Thickness Heads.	Handle Offset.	PRICE	
						Unfinished.	Semi-finished.
901	$\frac{1}{4}$	$\frac{11}{32}$	8	$\frac{3}{8}$	$\frac{13}{16}$	\$0 16	\$0 24
902	$\frac{5}{16}$	$\frac{5}{8}$	8	$\frac{3}{8}$	$\frac{13}{16}$	16	24
903	$\frac{3}{8}$	$\frac{3}{2}$	9 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{7}{8}$	20	30
904	$\frac{7}{16}$	$\frac{13}{16}$	9 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{7}{8}$	20	30
905	$\frac{1}{2}$	$\frac{3}{2}$	11	$\frac{1}{2}$	1	35	53
906	$\frac{9}{16}$	1	11	$\frac{1}{2}$	1 $\frac{1}{8}$	35	53
907	$\frac{5}{8}$	1 $\frac{7}{8}$	13	$\frac{5}{8}$	1 $\frac{1}{2}$	50	75
908	$\frac{3}{4}$	1 $\frac{1}{2}$	15	$\frac{1}{2}$	1 $\frac{1}{4}$	65	97
909	$\frac{7}{8}$	1 $\frac{1}{2}$	17	$\frac{3}{4}$	1 $\frac{5}{8}$	85	1 28
910	1	1 $\frac{1}{8}$	19	$\frac{1}{2}$	1 $\frac{3}{8}$	1 10	1 65

CAR WRENCHES.

22½° Angle.

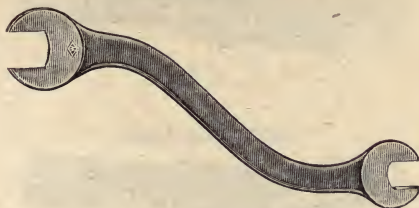


Fig. D. 575.

Unfinished are broached only.

Semi-finished are broached, case-hardened all over.

When ordering, please state if wrenches are to be unfinished or semi-finished.

Number.	For U. S. Standard Nuts, Size Bolts.	Openings.	Extreme Length.	PRICE.	
				Un- finished.	Semi- finished.
367	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{3}{8}$ and $\frac{1}{2}$	12	\$ 50	\$ 75
370	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{1}{2}$ and $\frac{3}{4}$	19	85	1 28
371	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	19	85	1 28
372	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{1}{2}$ and $\frac{3}{4}$	20	92	1 38
373	$\frac{5}{8}$ and $\frac{3}{4}$	$\frac{5}{8}$ and $\frac{3}{4}$	20	92	1 38
374	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	21	1 00	1 50
375	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	21	1 00	1 50
376	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	21	1 00	1 50
377	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	22	1 10	1 65
378	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	22	1 10	1 65
379	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	22	1 10	1 65
380	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{3}{4}$ and $\frac{1}{2}$	23	1 23	1 85
381	$\frac{7}{8}$ and $\frac{1}{2}$	$\frac{7}{8}$ and $\frac{1}{2}$	23	1 23	1 85
382	$\frac{7}{8}$ and $\frac{1}{2}$	$\frac{7}{8}$ and $\frac{1}{2}$	23	1 23	1 85
383	$\frac{7}{8}$ and $\frac{1}{2}$	$\frac{7}{8}$ and $\frac{1}{2}$	24	1 40	2 10
385	$\frac{1}{2}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	24	1 40	2 10
387	$\frac{1}{2}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	25	1 70	2 55
389	$\frac{1}{2}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	25	1 70	2 55

Discount.....

WRENCHES.

Coe's Solid Steel.



Fig. D. 576.

"L. & S." Steel Handle.



Fig. D. 577.

Girard Steel Handle.



Fig. D. 578.

Inches.....	6	8	10	12	15	18	21
Black, per doz	\$9 00	10 00	12 00	14 00	24 00	30 00	36 00

All of above Wrenches billed on above list at varying discounts.

Discount.....

Coe's Key Model.



Fig. D. 579.

28 inch, weight	19 lbs	.....each,	\$19 75
36 " " "	27 "	.....	19 00
48 " " "	62 "	.....	47 00

Discount.....

WRENCHES.

Coe's Genuine Knife Handle.

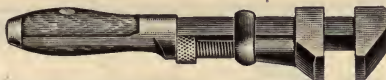


Fig. D. 580.

"L. & S." Engineers.
Case Hardened.



Fig. D. 581.

"Lamson Rapid."
Case Hardened.



Fig. D. 582.

Inches.....	6	8	10	12	15	18	21
Black, per doz.....	\$9 00	\$10 00	\$12 00	\$14 00	\$24 00	\$30 00	\$36 00

All of above Wrenches billed on above list at varying discounts.

Discount.....

"PERFECT HANDLE."



Fig. D. 582-1.

The entire bar, from top of head to end of handle is drop forged. The swell of the handle is largest at the end, giving from one to three inches more leverage, depending on the size of the wrench.

Water-proof handles locked in under pressure. No splits, no cracks. The wooden handle is there to stay.

Length, inches.....	6	8	10	12	15	18	21
Jaw opening, inches...	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2 $\frac{3}{16}$	2 $\frac{1}{2}$	3 $\frac{1}{8}$	4
List price, per doz.....	\$9 00	\$10 00	\$12 00	\$14 00	\$24 00	\$30 00	\$36 00

For complete line of "Perfect Handle" Tools please refer to pages 729 to 733 inclusive.

Discount.....

REVERSIBLE RATCHET WRENCH.

The Favorite.

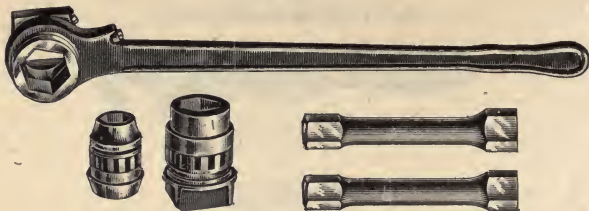


Fig. D. 584.

Its motion is continuous until nut is seated or removed. Opening through head allows bolt to pass clear through. Nut encompassed on all sides by head, cannot slip and become injured. Reverse motion instantaneous by simply turning pawl from right to left or *vice versa*.

Can be used in narrower places than an ordinary wrench.

Wrench No.	Length of Handle.	Take Heads.	Head Sent Unless Otherwise Specified.	Price, Handle and One Head.
1	15 in.	A B C	A	\$4 50
2	28 "	D E F G M	E	5 50
2½	28 "	X Y Z	X	6 50
3	28 "	H K L	H	7 50

Two extra heavy extension sockets (fitting hexagon opening of E head) 10 inches long for ¾-inch square and hexagon U. S. Standard Nuts. **Per set \$1.00.**

Discount.....

Price List of Favorite Ratchet Wrench Heads.

Showing heads that have square and hexagon openings, and those having hexagon openings only.

Head.	Openings for U. S. Standard Nuts, in Inches.		Exact Size of Openings, in Inches.		Price.	Fit Handles.
	Square.	Hexagon.	Square.	Hexagon.		
*O	½ x ¾	½ x ¾	\$2 00	No. 0
A	¾	¾	¾	¾	2 50	No. 1
B	¾	¾	¾	¾	2 50	
C	¾	¾	¾	¾	2 50	
D	¾ x ¾	1 ½ x 1 ½	3 00	No. 2
E	.....	¾ x ¾	.....	1 ½ x 1 ½	3 00
F	¾	¾	1 ½	1 ½	3 00	
G	¾	¾	1 ½	1 ½	3 00	No. 2½
M	.....	1 x 1 ½	.....	1 ½ x 1 ½	3 00
Z	.....	1 ½ x 1 ½	.....	1 ½ x 2 ½	3 00
H	1	1	1 ½	1 ½	4 00	No. 3
K	1 ½	1 ½	1 ½	1 ½	4 00	
L	1 ½	1 ½	2 ½	2 ½	4 00	

*See opposite page.

Discount.....

REVERSIBLE RATCHET WRENCH.

The Favorite.

No. O Wrench and Attachments.

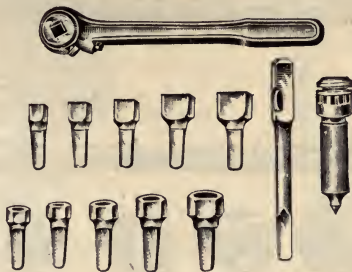


Fig. D. 585.

	Japanned.	Nickel Plated.
One 15-inch Handle and one Head with openings for $\frac{1}{4}$ and $\frac{3}{8}$ -inch square U. S. Standard Nuts.....	\$4 00	\$6 00
One set of Sockets to fit Head, consisting of one 8-inch Extension Socket, ten Sockets to fit U. S. Standard Nuts (1 each) Square and Hexagon, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{8}$, $\frac{1}{4}$ inches....	3 00	4 00
One 15-inch Handle with Drill Head.....	7 50	9 50
Drill Head only.....	6 00	8 00

Discount.....

REVERSIBLE RATCHET WRENCHES.



Fig. D. 583.

It can be changed into a Ratchet Drill by removing the cap and replacing the gear by a drill socket.

This Wrench can be changed to a right or left hand motion at pleasure.

Price of Wrench With One Gear Only.			Price Extra Wrench Gears.		
No.	Lever, Inches.	Price, Each.	No.	Square Opening, Ins.	Hexagon Opening, Ins. Each.
1	10	\$3 00	1	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ \$0 50
2	12	4 00	2	$\frac{1}{2}$, $\frac{3}{4}$, 1	$\frac{1}{2}$, $\frac{3}{4}$, 1 60
3	15	5 00	3	$\frac{3}{4}$, 1 , $1\frac{1}{4}$	$\frac{3}{4}$, 1 , $1\frac{1}{4}$ 75
3 $\frac{1}{2}$	18	6 00	4	1 , $1\frac{1}{4}$, $1\frac{1}{2}$	1 , $1\frac{1}{4}$, $1\frac{1}{2}$ 1 00
4	18	7 00			
4 $\frac{1}{2}$	24	9 00			

In ordering Wrenches please advise the size and shape (square or hexagon) of hole wanted.

Discount.....

LAG SCREW WRENCH.

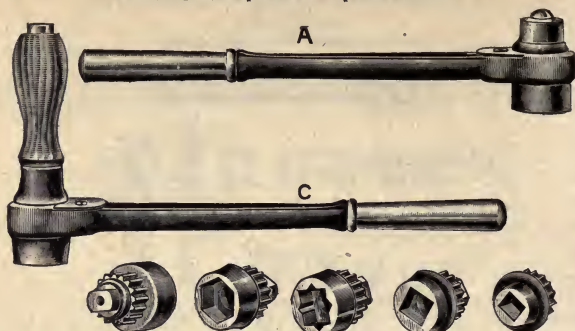


Fig. D. 587.

Designed for turning coach screws, nuts or bolts, either way, without taking off the Wrench. Are easily changeable for various sizes, by means of the different sockets.

No.	Length Handle.	Style.	Price, With One Socket.	Size Nut Each Size Will Take (Small Diameter), Inches.	Extra Sockets Each.
1	12 in.	A	\$1 75	$\frac{1}{2}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{1}{4}$ 1 $1\frac{1}{8}$ $1\frac{1}{2}$ $1\frac{1}{4}$ Sqr.	\$0 40
1	12 "	C	2 00	$\frac{1}{2}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{1}{4}$ 1 $1\frac{1}{8}$ $1\frac{1}{2}$ Hex.	40
2	16 "	A or C	3 00	$1\frac{1}{8}$ $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{7}{8}$ Hex. or Sqr.	75
3	20 "	A or C	4 50	$1\frac{1}{2}$ $1\frac{7}{8}$ 1 $1\frac{1}{4}$ Hex. or Sqr.	1 00

One Socket with each Wrench.

Discount.....

STEEL SOCKET BRIDGE WRENCH.



Fig. D. 588.

No.	Length Handle, Feet.	Weight, Lbs.	Price, With One Socket, Each.	Will Take Sockets Having Sqr. or Hex. Openings, Sizes.	Extra Sockets, Each.
1	2	10	\$ 6 00	$1\frac{1}{2}$, $1\frac{7}{8}$, $1\frac{1}{2}$, $1\frac{1}{4}$, 2 inch	\$1 00
2	3	23	14 00	$2\frac{1}{8}$, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, $3\frac{1}{4}$ inch	2 50
3	3	50	20 00	$3\frac{1}{4}$, $3\frac{3}{4}$, $3\frac{1}{2}$, $4\frac{1}{4}$, 5 inch	4 50

Please order by size of nut, small diameter, rather than by size of bolt. Odd sizes made to order. One socket with each wrench.

Discount.....

WATCHMAN'S PORTABLE CLOCKS.

"Chicago."



Fig. D. 589.
Clock in case opened, showing
dial in place and partial
registration.

Tamper-Proof.

Simple.

Durable.

Efficient.

Fully
Guaranteed.



Fig. D. 589-1.
Clock in leather carrying case
ready for service.

Approved by the National Board of Fire Underwriters.

Aluminum case; non-corrosive. Dial record is for 24-hour period, but clock with 12-hour record furnished if desired. A safety device records on the dial sheet each and every opening or closing of the clock, assuring detection should the watchman find the key to open the clock. The movement should be wound daily, but if forgotten, it will go 60 to 72 hours without winding.

Keys are heavy and strong. Successful duplication wholly impossible.

Complete outfit consists of clock, leather carrying case, the proper number of stations with keys and one year's supply of dials.

Price, complete outfit for nine stations.....\$60 00

Price, complete outfit for sixteen stations..... 70 00

Price, complete outfit for twenty-four stations..... 85 00

Discount.....

The "Argus."

Approved under the rules and requirements of the National Fire Protection Engineers and all Boards of Underwriters.

High grade jeweled movement of the quality of a good watch. Watch, keys and stations constructed and arranged to detect the least tampering. Impossible for watchman to "beat" clock.

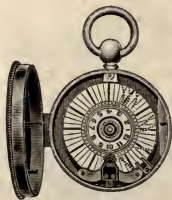


Fig. D. 590.

SIZE.		Weight.	Price, Each, Complete Outfit.			
Diam-eter.	Thick-ness.		6 Station	9 Station	12 Station	18 Station
3 1/4 in.	1 1/4 in.	28 oz.	\$32 50	\$35 00	\$37 50	\$45 00

Discount.....

Complete outfit consists of Clock, Stations, Leather Pouch and one years' supply of Dials.

COPYING PRESSES.



Fig. D. 591.

Style B.

With Wheel, Lever or Ball Lever.

Finished in Plain Black.

No.	Size of Follower.	Price, each.
4.....	10 x 12½ inches.	\$ 5 25
5.....	10 x 15 "	6 00
6.....	11 x 16 "	9 00
8.....	12 x 18 "	11 75

Discount.....

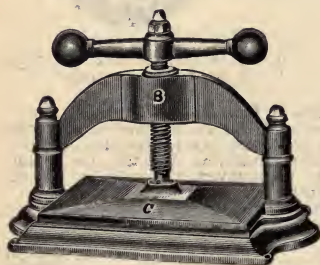


Fig. D. 592.

Style C.

With Wheel, Lever or Ball Lever.

Finished in Plain Black.

No.	Size of Follower.	Price, each.
3.....	9 x 11 inches	\$ 5 25
4.....	10 x 12½ "	6 00
5.....	10½ x 14½ "	7 50
6.....	10 x 15½ "	8 00
7.....	11½ x 17 "	10 00
8.....	11 x 18 "	10 75

Finished in Black and Bronze, add 50 cents to list prices.

Discount.....

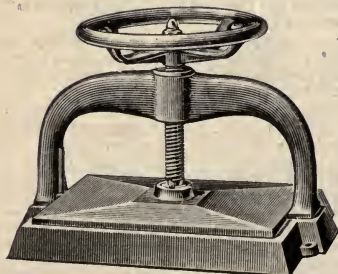


Fig. D. 593.

Style N.

With Wheel or Ball Lever.

Size of Follower, 15x20 inches.

Price, each finished in Plain Black.....	\$18 00
Price, each finished in Black and Bronze.....	19 00
Price, each finished in Black, Carmine and Bronze...	20 00

Discount.....

COPYING PRESSES.

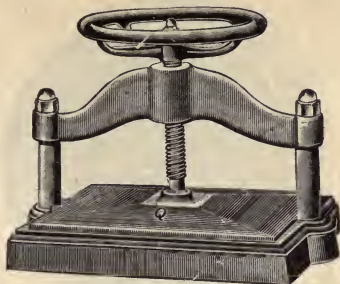


Fig. D. 594.

Styles Q and U.

With Wheel or Ball Lever.

Style Q.

Size of Follower 16 x 21 Inches.

Price, Each, Plain Black	\$22 00
Price, Black and Bronze	23 00
Price, Black, Carmine and Bronze	30 00

Discount

Style U.

Finished in Plain Black.

Each.

Size of Follower, 15 x 20	\$18 00
Size of Follower, 16 x 20	20 00
Size of Follower, 18 x 22	23 00
Size of Follower, 20 x 30	60 00

Discount

Style R.

With Wheel or Ball Lever.

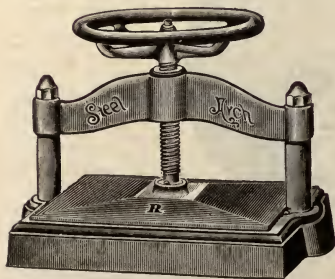


Fig. D. 595.

Finished in Plain Black.

Size of Follower.	Each.
15 x 20 inches	\$29 00
16 x 21 "	30 00

Finished in Black and Bronze.

Size of Follower.	Each.
15 x 20 inches	\$30 50
16 x 21 "	31 50

Finished in Black, Carmine and
Bronze.

Size of Follower.	Each.
15 x 20 inches	\$36 00
16 x 21 "	37 00

Discount

MEASURING TAPES.

Metallic.

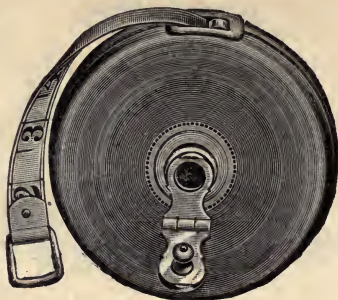


Fig. D. 596.

Made of best woven linen with Metallic Warp. Hard leather cases, brass folding handles and brass trimmings.

With Five-Eighths Inch Tape.

Length in Feet.....	25	33	40	50	66	75	100
Price complete, each..	\$1 80	\$2 10	\$2 30	\$2 60	\$3 00	\$3 30	\$4 20
Tapes only, each.....	90	1 10	1 30	1 50	1 80	2 00	2 90
Cases only, ".....	90	1 00	1 00	1 10	1 20	1 30	1 30

Discount.....

Ass' Skin Case.

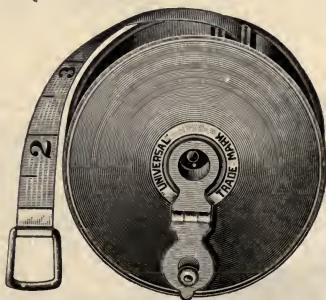


Fig. D. 597.

With One-Half Inch Tape.

Length in Feet.....	25	33	40	50	66	75	100
Cotton Tapes, dozen..	\$3 75	\$4 00	\$4 50	\$5 00	\$6 00	\$ 7 50	\$ 9 00
Linen Corded, ".....	5 00	5 50	7 00	8 00	9 00	10 00	12 50

Discount.....

MEASURING TAPES.

Steel.

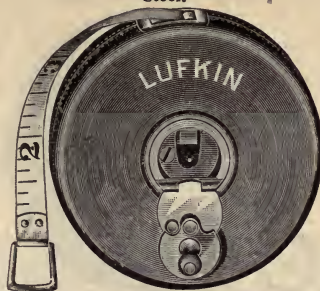


Fig. D. 598.

"Reliable."

With double folding flush handle, opened by pressing small pin or button on opposite side. Hard leather cases. Nickel plated trimmings. Measurements guaranteed perfectly accurate.

With Three-Eighths Inch Tape.

Length, in feet.....	25	33	40	50	66	75	100
Price, complete, each..	\$4 50	\$5 20	\$6 00	\$7 20	\$9 20	\$10 40	\$12 80
Tapes only, each.....	2 90	3 60	4 40	5 40	7 20	8 00	10 20
Cases " "	1 60	1 60	1 60	1 80	2 00	2 40	2 60

Divided in either 10ths or 12ths. All above tapes marked with links on back.

*Discount***"Reliable Junior."**

This steel tape is a counterpart of the "Reliable," and not much over one-half its size and weight, and although small and light, is constructed in a very durable manner.

With One-Fourth Inch Tape.

Length, in feet.....	25	33	50	66	75	100
Price, complete, each.....	\$3 75	\$4 00	\$4 60	\$5 25	\$5 75	\$7 00
Tapes only, each.....	2 25	2 50	2 75	3 25	3 50	4 50
Cases " "	1 50	1 50	1 85	2 00	2 25	2 50

*Discount***"Challenge."**

Hard leather cases, nickel plated trimmings, flush handle, $\frac{3}{8}$ -inch tape marked one side only, in tenths or twelfths.

Length, in feet.....	25	33	50	66	75	100
Price, complete, each.....	\$3 25	\$3 50	\$4 00	\$5 00	\$5 25	\$6 75

Discount

MEASURING TAPES.**Engineers' Pattern, Steel.****Fig. D. 599.**

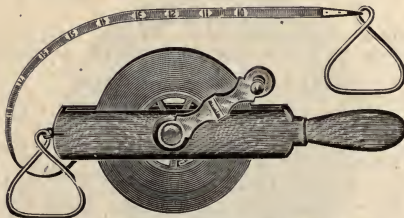
Hard leather steel lined cases, nickel plated trimmings, two detachable rings. The tape can be readily detached from the case, and we furnish an extra ring for the other end. The steel is heavier and stronger than used in the regular steel tapes, and the cases are thinner. Marked on one side in tenths or twelfths.

With One-quarter Inch Heavy Tapes.

Length in Feet.....	33	50	66	75	100
Price complete, each.....	\$5 00	\$6 00	\$8 00	\$9 50	\$12 00
*Tapes only, each.....	3 25	4 00	5 00	6 00	7 50

*Price of tapes includes two 1-inch rings.

Discount.....

SURVEYORS' CHAIN TAPES.**With Heavy One-quarter Inch Steel Tapes.**

Finished hardwood reel with large metal folding handle and two large detachable rings. Trimmings nickel plated.

Length in Feet.....	100	150	200
Price, each.....	\$6 00	\$7 50	\$9 00
Extra Links, price, per hundred.....	5 00	7 00	9 00

Discount.....

CAR WHEEL CIRCUMFERENCE GAUGES.



Fig. D. 601.

Master Car-Builders' Standard.

These Gauges are made of flexible tempered steel, with convenient adjustable handles, and are graduated to obtain accurately, by circumference measurement the standard diameters of car wheels, from 24 to 42 inches, at the proper distance from the inside of the flange, as adopted by the Master Car-Builders' Association.

The Gauges are graduated to indicate variations of size by sixteenths of an inch in terms of the diameter, above and below for each regular size included, and will be found well adapted for the purpose for which they are designed.

Price, Steel.....\$25 00

Discount.....

PORTABLE PLATFORM SCALES.
With Brass Beam, Sliding Poise and Set Screw.



Fig. D. 602.

With Oblong Platform.

Capacity, Pounds.	Platform, Inches.	With Wheels.		Without Wheels.	
		No.	Price.	No.	Price.
2500x $\frac{1}{2}$	26x34	1116	\$85 00	1100	\$80 00
2000x $\frac{1}{2}$	25x33	1118	75 00	1102	70 00
1500x $\frac{1}{2}$	21x28	1120	56 00	1104	52 00
1200x $\frac{1}{2}$	20x28	1122	49 00	1106	45 00
1000x $\frac{1}{2}$	17x26	1124	43 00	1108	39 00
800x $\frac{1}{2}$	17x26	1126	38 00	1110	34 00
600x $\frac{1}{2}$	16x25	1128	33 00	1112	30 00
400x $\frac{1}{2}$	15x21	1130	26 00	1114	23 00

With Square Platform.

Capacity, Pounds.	Platform, Inches.	With Wheels.		Without Wheels.		With Wheels and Drop Lever.	
		No.	Price.	No.	Price.	No.	Price.
600x $\frac{1}{2}$	23x23	1501	\$35 00	1487	\$32 00	1515	\$43 00
1000x $\frac{1}{2}$	25x25	1503	45 00	1489	42 00	1517	53 00
1200x $\frac{1}{2}$	27x27	1505	53 00	1491	50 00	1519	63 00
1500x $\frac{1}{2}$	29x29	1507	60 00	1493	56 00	1521	74 00
2000x $\frac{1}{2}$	31x31	1509	80 00	1495	75 00	1523	91 00

Discount.....

PORTABLE PLATFORM SCALES.

With Wheels and Drop Lever, Brass
Beam and Sliding Poise.



Fig. D. 603.

Beams have set screws in poises, and have graduations same as corresponding sizes of regular portable scales. Scales 1,000 pounds and larger have pillar brace. By means of drop lever, all bearings are relieved from wear and danger of breaking the scale mechanism when loading or removing heavy articles from platform.

No.	Capacity, Pounds.	Platform, Inches.	Price, Each.
1166	2,500x $\frac{1}{2}$	26x34	\$94 00
1168	2,000x $\frac{1}{2}$	25x33	82 00
1170	1,500x $\frac{1}{2}$	21x28	70 00
1172	1,200x $\frac{1}{2}$	20x28	59 00
1174	1,000x $\frac{1}{2}$	17x26	51 00
1176	800x $\frac{1}{2}$	17x26	46 00
1178	600x $\frac{1}{2}$	16x25	41 00
1180	400x $\frac{1}{2}$	15x21	34 00

Discount.....

With Wheels and Vibratory Axle.

With brass beam and sliding poise and set screw, and graduated 100 pounds by $\frac{1}{2}$ -pound division.

For general merchandise and especially for weighing dry hides, light bar iron and articles likely to hang over side, as the scales are mounted on high wheels.

Scales also furnished with drop lever to relieve bearings from wear as shown above at slight advance.

If desired brass weights and counter poise for use in hide and leather factories and warehouses at extra price.



Fig. D. 604.

No.	Capacity, Pounds.	Platform, Inches.	Price, Each.
1182	3,000x $\frac{1}{2}$	31x40	\$135 00
1184	2,500x $\frac{1}{2}$	26x34	102 00
1186	2,000x $\frac{1}{2}$	25x33	90 00
1188	1,500x $\frac{1}{2}$	21x28	77 00
1190	1,200x $\frac{1}{2}$	20x28	65 00
1192	1,000x $\frac{1}{2}$	17x26	57 00

Discount.....

PORTABLE PLATFORM SCALES.

With Double Brass Beam and Sliding Poises.

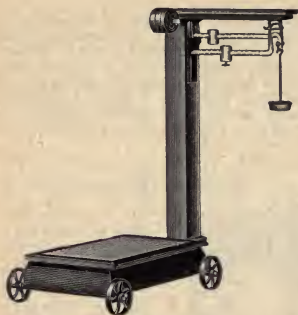


Fig. D. 605.

This scale is adapted to all general weighing where it is desirable to use one beam for a tare beam.

Capacity, lbs.	Platform, in.	With Wheels.		Without Wheels.	
		No.	Price.	No.	Price.
400x $\frac{1}{2}$	15x21	1276	\$ 30 00	1270	\$ 27 00
600x $\frac{1}{2}$	16x25	1278	37 00	1272	34 00
1000x $\frac{1}{2}$	17x26	1280	47 00	1274	43 00

Discount

WHEELBARROW SCALES.

Made Entirely of Metal.

Beams graduated 100 pounds by 1-pound divisions.

Furnished with set of inclines.

For weighing coal, ore or other substances in barrows.



Fig. D. 606.

Capacity, pounds.	Platform, inches.	With Wheels.		Without Wheels.	
		No.	Price.	No.	Price.
1000x1	42x30	1384	\$75 00	1382	\$70 00
1000x1	42x30	5389	85 00	5387	80 00

Discount

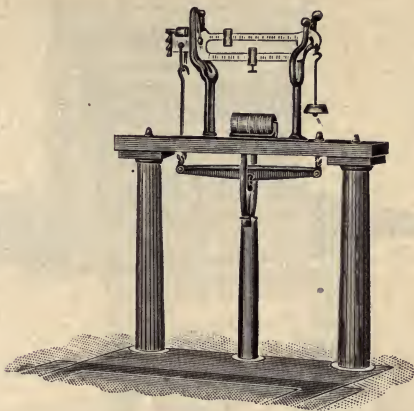
DORMANT WAREHOUSE SCALES.**Two Short Iron Pillars.**

Fig. D. 607.

Platform of this scale is set level with floor, so that two or four-wheel warehouse trucks may be handled on it and material need not be lifted on or off the scale.

Barrels and casks may be rolled on platform and quickly weighed.

Double brass beam, sliding poise and lower poise with set screw. Double beam is convenient to take tare of trucks or cases.

Furnished with set of marginal iron to protect wood floor surrounding platform.

No.	Capacity, Pounds.	Platform, Inches.	Price, Each.
1035	5,000 x $\frac{1}{2}$	48 x 48	\$160 00
1039	3,500 x $\frac{1}{2}$	42 x 44	120 00
1041	2,500 x $\frac{1}{2}$	46 x 37	100 00
5043	1,500 x $\frac{1}{2}$	42 x 30	90 00

Discount!

WAGON AND HAY SCALES.

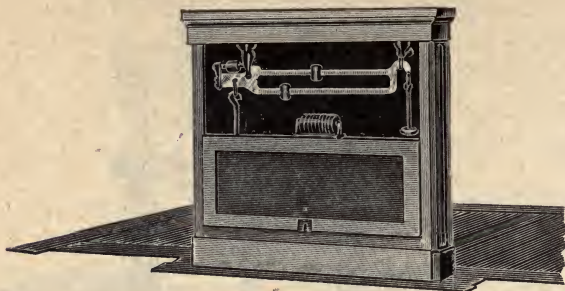


Fig. D. 608

The sizes of platform of these scales may be varied somewhat from dimensions given without increasing the cost of the scale.

We furnish extensions to carry the beams unusual distances from the platform at additional cost.

All prices are exclusive of the cost of timber and foundation.

No.	Capacity, Tons.	Size of Platform.	Distance from Edge of Platform to Beam Rod.	Price, Single Beam.	Price, Double Beam.
1800	20	22x10 ft. 3 $\frac{1}{8}$ in.	2 ft. 1 in.	\$570 00	\$585 00
1836	20	20x 7 ft. 9 $\frac{1}{2}$ in.	4 ft. 1 $\frac{1}{2}$ in.	520 00	535 00
1922	20	16x 7 ft. 10 in.	1 ft. 10 $\frac{1}{2}$ in.	450 00	465 00
1802	15	22x10 ft. 3 $\frac{1}{8}$ in.	2 ft. 1 in.	440 00	455 00
1838	15	18x 8 ft. 3 in.	4 ft. 5 $\frac{1}{2}$ in.	420 00	435 00
1924	15	14x 8 ft. 4 $\frac{1}{2}$ in.	2 ft. 1 in.	390 00	405 00
1806	10	22x10 ft. 3 $\frac{1}{8}$ in.	2 ft. 1 in.	365 00	380 00
1843	10	18x 8 ft. 3 in.	4 ft. 5 $\frac{1}{2}$ in.	350 00	365 00
1928	10	14x 8 ft. 4 $\frac{1}{2}$ in.	2 ft. $\frac{3}{4}$ in.	300 00	315 00
1845	8	20x 7 ft. 9 $\frac{1}{2}$ in.	4 ft. 1 $\frac{1}{2}$ in.	315 00	330 00
1930	8	16x 7 ft. 10 in.	1 ft. 10 $\frac{1}{2}$ in.	275 00	290 00
1846	6	18x 8 ft. 3 in.	4 ft. 5 $\frac{1}{2}$ in.	275 00	290 00
2100	6	22x 8 ft.	2 ft. 9 in.	250 00	265 00
2110	6	14x 8 ft.	2 ft. 2 $\frac{1}{2}$ in.	225 00	240 00
2112	5	14x 8 ft.	2 ft. 2 $\frac{1}{2}$ in.	200 00	210 00
2114	4	14x 8 ft.	2 ft. 2 $\frac{1}{2}$ in.	170 00	180 00

Discount.....

WAGON SCALES.**Extra Heavy Iron Frame Railroad Pattern.
Single Railroad Beam—Capacity on Beam.**

These scales are of same design as the railroad track scales on page 294, and are therefore adapted for hard usage.

No.	Capacity, Tons.	Platform, Feet.	Price.	No.	Capacity, Tons.	Platform, Feet.	Price.
6580	15	14x8	\$450 00	6624	30	18x8	\$550 00
6582	20	14x8	475 00	6642	20	20x8	600 00
6602	20	16x8	500 00	6644	30	20x8	625 00
6622	20	18x8	525 00	6683	25	24x8	700 00

Double railroad beam, extra, \$20 00.

Above prices are exclusive of timber and foundation.

Discount

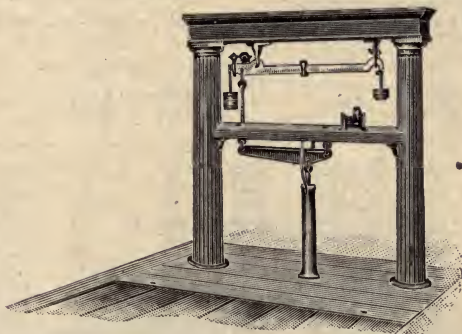
RAILROAD DEPOT SCALES.

Fig. D. 609.

These scales are designed for use in freight houses and factories for heavy weighing, and the platforms are of convenient size for handling of freight of all sorts. Prices are exclusive of timber and foundation.

Depot scales of other capacities will be furnished at corresponding prices.

No.	Capacity, Tons.	Platform.	Price.	
			Single Beam.	Double Beam.
6262	10	12 ft. x 8 ft. 10 in.	\$330 00	\$345 00
2264	6	10 ft. x 9 ft. 1½ in.	280 00	295 00
6272	6	8 ft. x 6 ft. 0½ in.	280 00	295 00
6274	6	6 ft. x 5 ft.	280 00	295 00
2266	4	9 ft. x 6 ft. 11 in.	230 00	240 00
6276	4	5 ft. x 4 ft.	230 00	240 00
6278	4	6 ft. x 5 ft.	230 00	240 00
2268	3	6 ft. x 4 ft. 11½ in.	210 00	218 50
2270	2	7½ ft. x 4 ft. 8½ in.	168 00	176 50

Discount

RAILROAD TRACK SCALES.

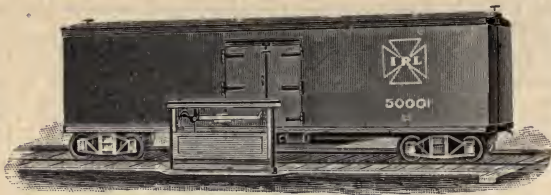


Fig. D. 610.

Prices do not include foundation or material for framing the scales which are to be furnished by purchaser.

Railroad scales furnished to be built with third or dead rail when so ordered, at extra price for metal supports.

No.	Platform, Feet.	Capacity, Tons.	Price.	No.	Platform, Feet.	Capacity, Tons.	Price.
4351	36	100	\$1,175 00	4362	48	70	\$1,350 00
4318	38	50	1,075 00	4364	48	80	1,375 00
4320	38	60	1,100 00	4387	48	100	1,425 00
4322	38	70	1,125 00	4368	50	60	1,350 00
4324	38	80	1,150 00	4370	50	70	1,375 00
4357	38	100	1,200 00	4372	50	80	1,400 00
4328	40	60	1,125 00	4393	50	100	1,450 00
4330	40	70	1,150 00	4376	52	60	1,375 00
4332	40	80	1,175 00	4378	52	70	1,400 00
4363	40	100	1,225 00	4380	52	80	1,425 00
4336	42	60	1,150 00	4399	52	100	1,475 00
4338	42	70	1,175 00	4384	54	60	1,400 00
4340	42	80	1,200 00	4386	54	70	1,425 00
4369	42	100	1,350 00	4388	54	80	1,450 00
4344	44	60	1,175 00	4405	54	100	1,600 00
4346	44	70	1,200 00	4392	56	60	1,425 00
4348	44	80	1,225 00	4394	56	70	1,450 00
4375	44	100	1,375 00	4396	56	80	1,475 00
4352	46	60	1,200 00	4411	56	100	1,625 00
4354	46	70	1,225 00	4400	58	60	1,550 00
4356	46	80	1,250 00	4402	58	70	1,575 00
4381	46	100	1,400 00	4404	58	80	1,600 00
4360	48	60	1,325 00	4417	58	100	1,650 00

Double Beam, extra.....\$20 00
Triple Beam, " 30 00

Discount.....

The above are sizes generally used. We are prepared to quote on any other size desired, upon application.

BOX TRUCKS.

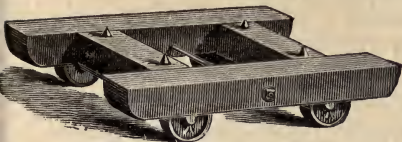


Fig. D. 611.
Nos. 1 and 2.

A low truck, strong and well made, for handling large boxes or bales. Sharp spur head bolts to prevent package from slipping. Axles turned and wheels bored.

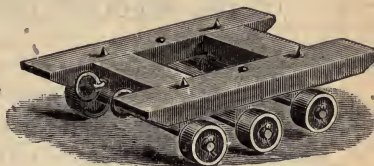


Fig. D. 612.
Nos. 3 and 4.

Balanced on center wheels, which are set lower than end wheels, so that trucks turn easily in any direction. Wood bolsters between frame and axles. Axles turned and wheels bored.

No.	Width, Inches.	Length, Inches.	Wheels, Inches.	Weight, Lbs.	Price, Each
1	18	18	4 x 1 $\frac{3}{4}$	28	\$ 5 00
2	18	26	4 x 1 $\frac{3}{4}$	36	6 00
3	16	24	3 $\frac{1}{2}$ x 1 $\frac{3}{4}$	45	8 00
4	22	36	3 $\frac{1}{2}$ x 1 $\frac{3}{4}$	70	10 00

Discount.....

NORWOOD VEHICLE TRUCK.

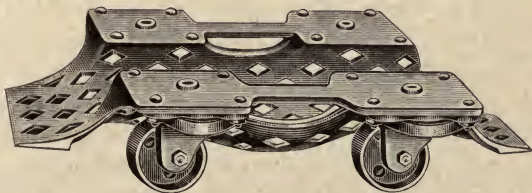


Fig. D. 613

Frame made of one solid piece of malleable iron; light, strong and rigid. Ball-bearing casters delicately respond, permitting load to be turned or moved easily in any direction.

With the aid of a set of these casters, two men can load or unload the heaviest automobile in less time than can be accomplished by a dozen men without the casters, and without bending fenders, lamp forks, etc., or injuring tires by dragging over nails and rough floors.

Also very useful for moving axles, bumpers, heavy crates, boxes, etc.,

No. 2, size 14 x 26 $\frac{1}{2}$each, \$7 50 No. 3, size 16 x 31 $\frac{1}{2}$each, \$10 00
Rubber covered wheels, \$2 50 per set extra.

Discount.....

THE HERCULES PRESSED STEEL TRUCK.

(Patented)

The Hercules Pressed Steel Warehouse Trucks have been in service over four years. From the beginning we appreciated the fact that the railroads with their army of men handling all classes of freight, had a practical knowledge that would be invaluable to the manufacturer who would work in harmony with them.

We knew our patents covered all the features of a practical and economical article, but only in a long series of tests conducted with the assistance of a number of railroads, and putting the sample trucks under the severest service possible, were we able to ascertain just what designs and shapes would give the satisfactory results we insisted on before we put the trucks on the market for general use.

We take this occasion to express our appreciation to the railroads for their valuable assistance, and for the many courtesies extended to us in these tests.

The Hercules Pressed Steel Truck is the strongest and most economical warehouse truck in use today. While the first cost must necessarily be greater than that of a wooden truck, its greater strength, and the large decrease in the cost of repairs, soon wipes out this difference in the first cost. At a low estimate twenty per cent of the wooden trucks in the large railroad stations are either broken beyond repair, or broken to such an extent that it would be economy to send them into the shops at once before they get in that condition where it would be cheaper to buy a new one than to have the old one repaired.

The designs shown herein are the ones selected as best meeting the requirements of the Railroads and Steamboat lines, but where conditions make it necessary we can make needed changes in weight, shapes and dimensions.

Descriptions and illustrations on following pages.

HERCULES PRESSED STEEL TRUCK.

(Patented.)

General Construction.

The side pieces of the Hercules Truck are pressed from a plate of special high carbon steel to a truss shaped angle. The cross pieces are either steel angles or in the shape of an inverted "U," riveted to the side pieces. The legs are also riveted to the side pieces, and the nose piece, or dash, is bolted to the same. The handles are of hickory, as a wood handle is preferred by those using trucks, and our experience has shown that very few of our wood handles are broken in use, and if broken by accident can be replaced in a very few minutes, and without sending the truck from the station

The wheels and nose piece can also be replaced if necessary without sending to the shop, thus the number of extra trucks usually kept on hand to take the place of those sent to the shops can be greatly reduced.

We make Trucks inclined to various angles from the perpendicular. In ordering please indicate the angle desired as shown herewith.

We furnish handles of two shapes, either the regular slightly curved handle as shown on page 298, or what is termed the "plow handle" (Fig. D.618) page 299.

When ordering kindly advise which style is desired.

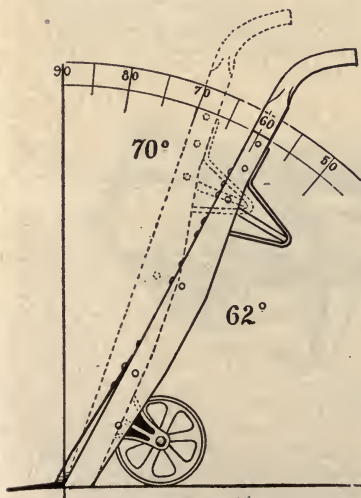


Fig. D. 614.

THE HERCULES PRESSED STEEL TRUCK.

(Patented)

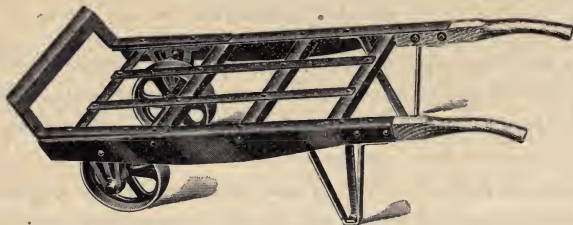


Fig. D. 615.

B. P. 501A. No. 4.

Length over all, 5 feet.
Width at Nose, 24 inches.
Height of Nose, 6 inches.
Width over all at Handles, 24 inches.

Height over all at Wheel, $12\frac{1}{2}$ inches.
Height over all at Leg, $13\frac{1}{2}$ inches.
Wheel, $10\frac{3}{8}$ inches in diameter.
Weight, 128 pounds.

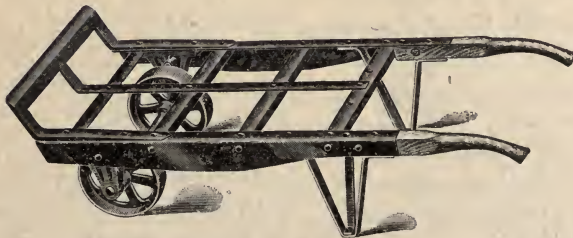


Fig. D. 616.

B. P. 576. No. 4X.

Length over all, 5 feet.
Width at Nose, 24 inches.
Height of Nose, 6 inches.
Width over all at Handles, 24 inches.

Height over all at Wheel, $12\frac{1}{2}$ inches.
Height over all at Leg, $13\frac{1}{2}$ inches.
Wheel, $10\frac{3}{8}$ inches in diameter.
Weight, 128 pounds.

Prices upon application.

Always mention B. P. Number.

THE HERCULES PRESSED STEEL TRUCK.

(Patented)



Fig. D. 617.

B. P. 577. No. 4XX.

Length over all, 5 feet.
 Width at Nose, 24 inches.
 Height of Nose, 6 inches.
 Width over all at Handles, 24 inches.
 Wheel, $10\frac{1}{2}$ inches in diameter.
 Weight, 130 pounds.

B. P. 544. No. 5XX.

Length over all, 5 feet, 4 inches.
 Width at Nose, 25 inches.
 Height of Nose, 6 inches.
 Width over all at Handles, $24\frac{1}{2}$ inches.
 Wheel, $11\frac{1}{2}$ inches in diameter.
 Weight 160 pounds.



Fig. D. 618.

B. P. 565. No. 4.

Length over all, 5 feet.
 Width, 24 inches.
 Wheels, $10\frac{1}{2}$ inches in diameter; $2\frac{1}{4}$ -inch tread.

Height of Nose, 6 inches.
 Two Straight and Two Curved Cross Pieces.
 Weight, 130 pounds.

Our newest design—will carry barrels or boxes over the most uneven floor or gang-plank. Extra strong nose piece.

Prices upon application.

Always mention B. P. Number.

THE HERCULES PRESSED STEEL TRUCK.

(Patented)



Fig. D. 619

B. P. 503. No. 4Q.

Length over all, 5 feet, 4 inches.
Height of Nose, 6 inches.
Size of Rack, 20 inches wide, 26 inches high.

Width at Nose, 24 inches.
Wheel, 10 $\frac{1}{2}$ inch diameter.
Weight, 160 pounds.
Made also with 4 Cross Pieces.

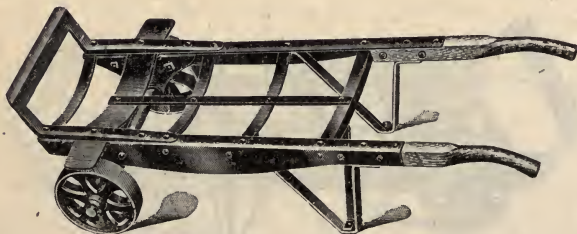


Fig. D. 620.

B. P. 540.

Length over all, 5 feet.
Width at Nose, 18 inches.
Height of Nose, 6 inches.
Width of Handles over all, 22 inches.
Height over all at Wheel, 12 inches.
Height over all at Leg, 13 inches.
Wheel, 10 $\frac{1}{2}$ inches in diameter.

Made in 130, 140, 150 and 160 pound weights.
Depression of first Cross Piece from Nose 2 inches.
Depression of first Cross Piece from Handle, 1 inch.
Width of Lip over Wheel, 4 inches.
Length of Lip over Wheel, 5 inches.

Also furnished to same dimensions, but with straight cross bars instead of curved.

Prices upon application.

Always mention B. P. Number.

THE HERCULES PRESSED STEEL TRUCK.

(Patented)



Fig. D. 621.

B. P. 558.

Length over all, 5 feet.
Width over all at Wheel, 32 inches.
Width over all at Handles, 21½ inches.
Width at Nose, 21½ inches.
Height of Nose, 5 inches.
Height over all at Wheel, 12½ inches.

Height over all at Leg, 8 inches.
Depression of first and second Cross Pieces, 3½ inches.
Wheel, 11½ inches diameter, 2½-inch tread.
Weight, 140 pounds.

The Favorite Truck in the Southern Atlantic Points.



Fig. D. 622.

B. P. 568.

Length over all, 5 feet, 4 inches.
Width at Nose, 17 inches.
Height of Nose, 6 inches.
Width over all at Handles, 22 inches.
Height at Wheels, 12½ inches.
Height at Leg, 9 inches.

Size of Lip over Wheels, 4½ inches square.
Depth of Cross Piece at Axle, 3½ inches.
Depth of Cross Piece next to Handle, 2½ inches.
Wheels, 11½ inches diameter.
Weight, 155 pounds.

The Standard Design for the New York Piers.

Prices upon application.

Always mention B. P. Number.

THE HERCULES PRESSED STEEL TRUCK.

(Patented)

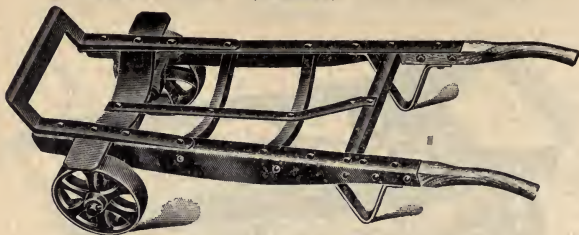


Fig. D. 623.

B. P. 582.

Length over all, 4 feet, 10 inches.
Width at Nose, 16 inches.
Height of Nose, 6 inches.
Width over all at Handles, 22½ inches.
Height at Wheel, 12½ inches.
Height at Leg, 9½ inches.
Wheels, 10½ inches diameter.
Weight, 126 pounds.

Depression of first Cross Piece from Nose, 2½ inches.
Depression of second and third Cross Pieces from Nose, 2½ inches.
Fourth Cross Piece next Handle straight.
Width of Lip over Wheel, 4 inches.
Length of Lip over Wheel, 4 inches.

A Favorite Truck on Railroads in South Atlantic Section of United States

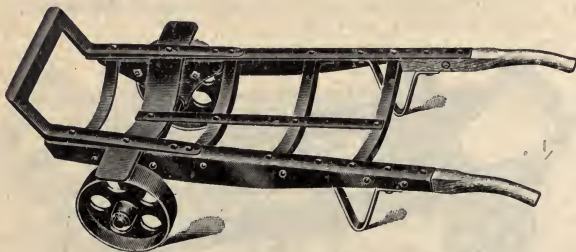


Fig. D. 624.

B. P. 583.

Length over all, 4 feet, 10 inches.
Width at Nose, 17 inches.
Height of Nose, 7 inches.
Width over all at Handles, 24 inches.
Height at Wheels, 12½ inches.
Height at Leg, 9½ inches.
Wheels, 11½ inches diameter.
Weight of Truck, 150 pounds.
Depression of first Cross Piece from Nose, 3 inches.

Depression of second Cross Piece from Nose, 2½ inches.
Depression of third Cross Piece from Nose, 2½ inches.
Depression of fourth Cross Piece from Nose, 2½ inches.
Depression of fifth Cross Piece from Nose, 2 inches.
Width of Lip over Wheel, 4 inches.
Length of Lip over Wheel, 5 inches.

A Favorite Truck on the Southern Roads.

Prices upon application.

Always mention B. P. Number.

TRUCKS.

Western Pattern.



Fig. D. 625.
No. 0 to 3.

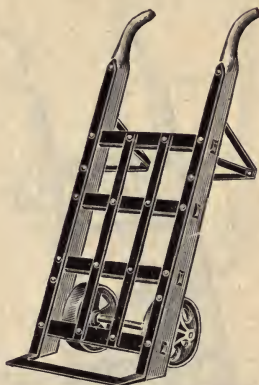


Fig. D. 626.
No. 4.

Axles turned and wheels bored, steel nose, side straps, axles and legs.

These Trucks are made of the best second-growth hickory, ash or oak lumber, hickory being mostly used for handles. Bolts pass through iron, tenons and handles. Axle and collar forged from one piece by special machinery.

No.	Length of Handle.		Width, Inches.	Diam. of Wheel, Inches.	Kind.	Weight, Pounds.	Price.
	Ft.	In.					
0	3	6	19	6 $\frac{1}{8}$	Half ironed	42	\$ 6 00
0	3	6	19	6 $\frac{1}{8}$	Full "	49	7 00
1	3	11	19	6 $\frac{1}{8}$	Half "	46	7 00
1	3	11	19	6 $\frac{1}{8}$	Full "	50	8 00
2	4	4	21	7 $\frac{1}{4}$	Half "	56	9 00
2	4	4	21	7 $\frac{1}{4}$	Full "	66	10 50
3	4	8	22	8 $\frac{1}{4}$	Half "	77	13 00
3	4	8	22	8 $\frac{1}{4}$	Full "	87	15 00
4	5		24	10 $\frac{1}{4}$	Full "	120	20 00

Discount.....

TRUCKS.

Western Pattern.



Fig. D. 627.
No. 4 X.



Fig. D. 628.
No. 4 XX.

Extra heavy. Full ironed. Cross bars and straps bolted through handles. Axles turned and wheels bored. Steel nose, side straps and axles.

These Trucks are made of the best selected second-growth hickory, ash or oak lumber, hickory being mostly used for handles. Iron on cross pieces extends through to outside of handles, with bolts passing through iron, tenons and handles. Axle and collar forged from one piece by special machinery. All parts made in the most substantial manner and will stand the roughest usage.

No.	Length of Handle, Feet.	Width, Inches.	Diameter of Wheel, Inches.	Weight, Lbs.	Price.
4x.....	5	24	10½	126	\$22 00
4xx.....	5	24	10½	137	28 00
*5.....	5½	25	12	150	24 00

*Same construction as No. 4xx except center straps are not welded to nose.

Discount.....

TRUCKS.**Western Pattern Barrel.**

One wood and three curved iron cross-bars. Made with all four bars curved iron if so ordered at slight advance.

Steel nose, straps, cross-bars and axles.

Full ironed.

No.	Length of Handle.	Width.	Diameter of Wheel.	Weight.	Price.
	Ft. In.	Ins.	Ins.	Lbs.	
1	3 11	19	6 $\frac{1}{4}$	55	\$ 9 00
2	4 2	21	7 $\frac{1}{4}$	75	11 00
3	4 6	22	8 $\frac{1}{4}$	90	16 00
4	5	24	10 $\frac{1}{4}$	117	21 00



Fig. D. 629.

Discount.....

SKIDS.

Fig. D. 630.

Length and Kind.	Dimensions of Side Rails, Inches.	Number of Cross Bars.	Weight in Pounds Each.
6 feet, Light.....	1 $\frac{1}{2}$ x2 $\frac{1}{2}$	2	24
6 " Heavy.....	1 $\frac{1}{2}$ x3 $\frac{1}{2}$	2	40
7 " Light.....	1 $\frac{1}{2}$ x2 $\frac{1}{2}$	2	28
7 " Heavy.....	1 $\frac{1}{2}$ x3 $\frac{1}{2}$	2	45
8 " Light.....	1 $\frac{1}{2}$ x2 $\frac{1}{2}$	2	30
8 " Heavy.....	1 $\frac{1}{2}$ x3 $\frac{1}{2}$	2	52
9 " ".....	1 $\frac{1}{2}$ x3 $\frac{1}{2}$	3	63
10 " ".....	1 $\frac{1}{2}$ x4	3	65
12 " ".....	1 $\frac{1}{2}$ x4 $\frac{1}{2}$	4	85

Any size under six feet, same price as six feet.

These Skids are made of the best selected hickory lumber. We also make to order special sizes. Heavily ironed at both ends, as shown in cut.

Price, Light Pattern.....per foot, \$1 00
 " Heavy "....." 1 25

Discount.....



Fig. D. 631.

The front wheels being casters, the truck *will turn in its own length*, and can be run on elevator or scales from any angle, with great ease. As it requires but one man to operate it, it can be readily seen that the saving in labor would soon pay for the truck.

No.	Size of Platform in Feet*.	Diam. of Wheels, Inches.	Diam. of Casters, Inches.	Height to Top of P'tform Inches.	Capacity in lbs.	Weight, lbs.	Price, Each.
1	2 x4	12	6	14	1,200	152	\$25 00
3	2½x4	12	6	14	1,200	172	26 10
4	2 x5	12	6	14	1,200	161	26 10
5	3 x4	12	6	14	1,200	173	27 00
6	2½x5	12	6	14	1,200	175	27 00
8	3 x5	12	6	14	1,200	192	29 25
9	2 x4	18	9	19	3,000	217	30 00
11	2½x4	18	9	19	3,000	229	31 50
13	2½x4½	18	9	19	3,000	237	32 25
15	3 x4	18	9	19	3,000	246	33 00
16	2½x5	18	9	19	3,000	243	33 00
18	2 x5	18	9	19	3,000	230	32 25
19	2 x6	18	9	19	3,000	240	33 00
20	2½x6	18	9	19	3,000	255	34 50
21	3 x5	18	9	19	3,000	255	35 25
22	3 x6	18	9	19	3,000	270	36 00
23	3 x8	18	9	19	3,000	310	40 00

For very heavy work.

*The trucks are about 4 inches longer over all.

Discount.....

RUBBER TIRED WHEELS.

Trucks numbered 1 to 8, inclusive, with grooved wheels and casters, with round rubber tires sprung into groove. Price \$8.00 extra per truck.

Trucks numbered 1 to 8, inclusive, with patent rubber tired wheels and casters. Price \$12.00 extra per truck.

Trucks numbered 9 to 23, inclusive, with patent rubber tired wheels and casters. Price \$24.00 extra per truck.

All trucks furnished with ball bearing casters. If roller bearing wheels are desired, add \$2.50 per truck to the price list.

Discount.....

TRUCKS.

Heavy Freight House.

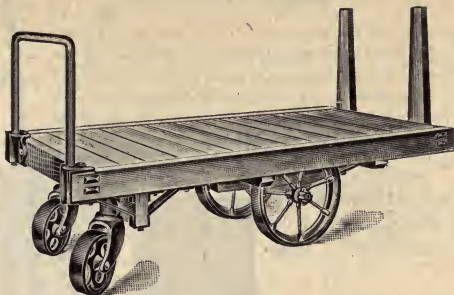


Fig. D. 632.

Similar in design to truck shown on opposite page. The platform is 3x6 feet, height 19 inches, capacity 6,000 pounds. 18-inch roller bearing wheels. 9-inch patent ball bearing casters. Weight 370 pounds. A most efficient, economical and easily operated truck for handling freight.

Price.....\$40 00

Discount.....

Warehouse.

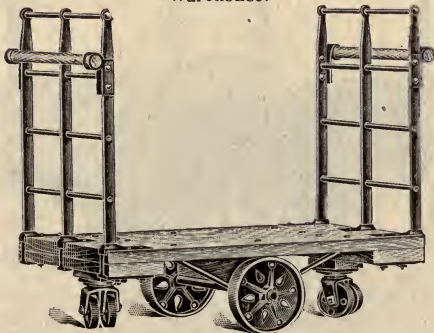


Fig. D. 633.

Original design. The platform is 36 inches wide, 54 inches long, 14 inches high. Steel end rack 36 inches high, set edgewise into platform and with improved stamped steel socket braces on top platform.

Center wheels $11\frac{1}{2} \times 2\frac{1}{2}$ inches, end wheels $6 \times 1\frac{1}{2}$ inches, axle $1\frac{1}{2}$ inch square. Approximate weight 336 pounds.

Handles attached to top of end racks made of oak, 2 inches diameter.

Price.....\$38 00

Discount.....

TRUCKS.**Barrel.**

A very handy truck for use in connection with steel barrels equipped with lugs riveted to side of barrel. Indispensable in shops where small castings, forgings, etc., are to be transferred from one place to another. The lugs are fastened a little above the center of the barrel, so that when the truck is placed in position for moving, the barrel is lifted from the floor and can be easily dumped.

Price, Truck (without barrel) \$30 00

Price, Barrels (small size) . . . 7 00

Price, Barrels (Large size) . . . 9 00

Discount

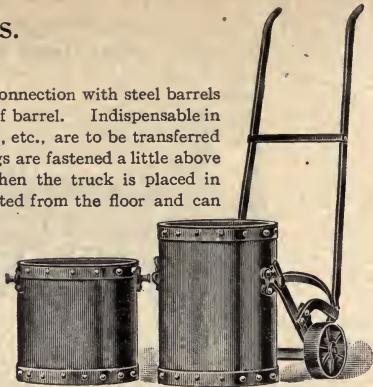


Fig. D. 634.

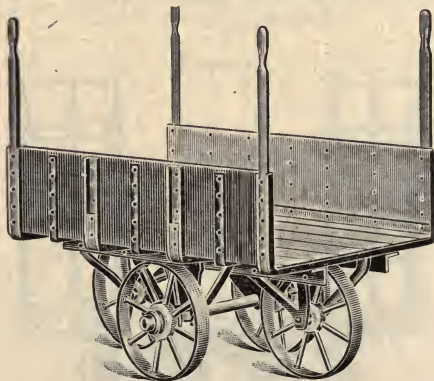
Hercules All Steel Four-Wheel Forge Shop Truck.

Fig. D. 635.

This truck is designed for carrying hot forgings and castings, saving at least one handling of material. It is easily handled, having four wheels, the end wheels are set up one-half inch higher than the center, permitting truck to be tilted and easily turned.

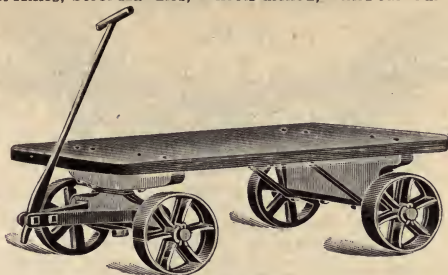
Size over all $50 \times 17\frac{1}{2} \times 47\frac{1}{2}$ inches, wheels $16\frac{1}{2}$ inches diameter, 4-inch hub, 2-inch tread, axles $1\frac{1}{2}$ -inch diameter, corner stakes 18 inches high. Height from floor to bed $17\frac{1}{2}$ inches; sides 12 inches deep, ribs 2-inch channel iron, weight 400 lbs.

Price each, \$40 00

Discount

WAGON TRUCKS.

Steel Axles, Steel Handles, Wheels drilled, Axles turned.

Fig. D. 636.
No. 249.

No.	Size of Platform.	Weight.	Price, Each.	Extra for Rubber Tires.
1	3 ft. 0 in. x 2 ft. 0 in.	115 lbs.	\$14 00	\$6 00
2	3 " 2 " x 2 " 2 "	120 "	15 00	6 00
3	3 " 4 " x 2 " 4 "	126 "	16 00	6 00
4	3 " 6 " x 2 " 6 "	150 "	17 50	6 50
5	3 " 8 " x 2 " 8 "	155 "	18 50	6 50
6	3 " 10 " x 2 " 10 "	160 "	20 00	6 50

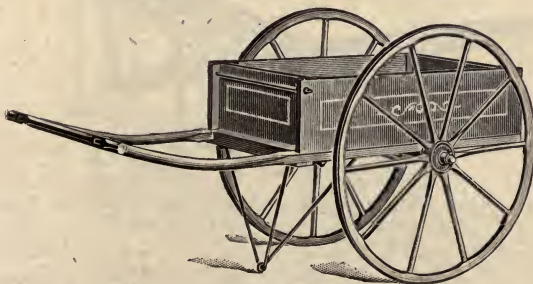
*Discount.....***HAND CARTS.**

Fig. D. 637.

Are strong, durable, and nicely painted; the box a dark green with red panels, striped in black and white and varnished. The wheels are painted bright red with black stripes. Both front and rear end gate are removable by loosening nut on rod at each end of Cart; the sides are also movable.

No.	Diameter, Wheel.	Width, Tires.	Size Box, Inside.	Depth Box, Inside.	Weight, Lbs.	Price, Each.
1	36 in.	1 in.	35½x21½ in.	9 in.	90	\$12 00
2	36 in.	1½ in.	60 x36 in.	9 in.	200	25 00

Discount.....

BAGGAGE BARROWS.

No. 255.



Fig. D. 638.

Curved pattern. Improved staggered wrought spoke wheels. Painted vermilion. Iron blacked.

No.	Length, Feet.	Width, Inches.	Wheel, Inches.	Weight, Lbs.	Price.
1.	9	24	20x2	345	\$40 00
2.	10	27	20x2	356	45 00
3.	13	29	20x2	425	55 00

Discount.

No. 256.



Fig. D. 639.

Sloping back pattern. Improved staggered wrought spoke wheels. Painted green. Iron blacked.

No.	Length, Feet.	Width, Inches.	Wheel, Inches.	Weight, Lbs.	Price.
1.	7	24	18x2	217	\$33 00
2.	9½	27	20x2	300	40 00
3.	9½	30	20x2	340	55 00

No. 1 has one center slat, No. 2 has two, and No. 3 has three.

All wheels used on these barrows are bored true to center, and axles turned.

Discount.

BAGGAGE WAGONS.

No. 258.



Fig. D. 640.

With Improved Staggered Wrought-Spoke Wheels
Steel fifth wheel, 20 inches in diameter.

No.	Length, Feet.	Width, Inches.	Dash, Inches.	Weight, Lbs.	Diam. Front Wheels.	Diam. Rear Wheels.	Price, Each.
1	7	26	28	475	20 in.	22 in.	\$70 00
2	10	27	35	600	20 "	22 "	80 00
3	12	32	44	725	20 "	22 "	90 00

Discount

EXPRESS WAGONS.

Improved Pattern.

No. 257.

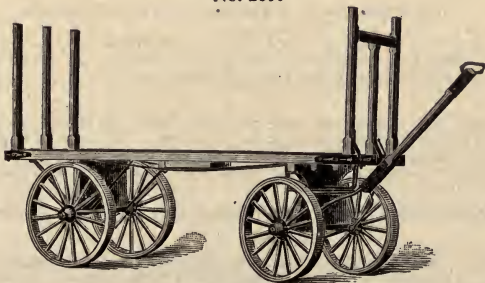


Fig. D. 641.

With "Sarven Patent" Wood Wheels.
Painted vermilion and green, striped and varnished.
Also furnished with American pattern iron wheels.
Steel fifth wheel, 20 inches in diameter.

Platform.			Wheels.		Weight, Lbs.	Price, Each.
Length.	Width.	Height.	Front.	Rear.		
10 ft.	39 in.	35 in.	28 in. Diam.	31 in. Diam.	670	\$100 00

Discount

CHARGING COAL WAGONS.



Fig. D. 642.

No. 347.

For Gas and Electric Light and Street Railway Plants.

We make these Charging Wagons of any desired size. The drop-gate may be attached to either side or back; it is hinged at bottom to let down, and forms a platform over which the contents may be shoveled out.

No. 346. Bed, 54 $\frac{1}{2}$ inches long, 30 inches wide, 13 inches deep, of No. 12 gauge steel; height of bottom from floor, 13 $\frac{1}{2}$ inches. Wheels, 12 inches in diameter, 3 inches tread. Steel axles, 1 $\frac{1}{2}$ inches square by 30 inches long. Steel fifth-wheel, 15 inches in diameter. Heavy steel axle braces front and rear. Painted steel color.

Weight, 490 pounds. Capacity, 600 pounds.....Price, \$60 00

No. 347. Bed, 60 inches long by 36 inches wide by 18 inches deep, of No. 12 gauge steel. Wheels, 16 inches in diameter, 3 inches tread. Other parts are same as in No. 346. Painted steel color.

Weight, 660 pounds. Capacity 1,000 lbs.....Price, \$75 00

No. 348. Wooden Charging Wagon, with bed of the same size as No. 347, and of 1 $\frac{1}{2}$ inch oak. This Wagon has improved staggered wrought spoke wheels, 20 inches in diameter, 2 inches tread. Steel axles, 1 $\frac{1}{2}$ inches square. Height of bottom from floor, 25 inches. Painted red.

Weight, 610 pounds.....Price, \$50 00

Discount.....

ICE CART.

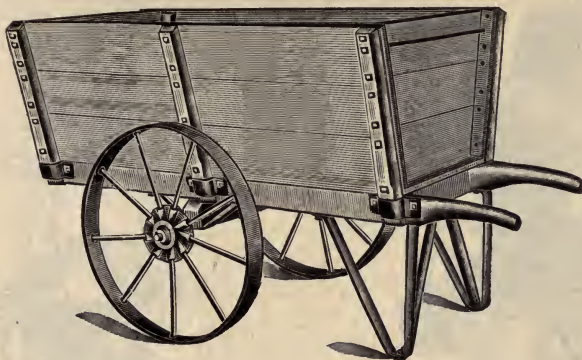


Fig. D. 643.

No. 338.

Used at Railway Stations for supplying Passenger Cars with Ice.

Flaring Box. Inside length 60 inches, width 31 inches at top. Bottom 22 inches wide. Depth, 21 inches. Box of $\frac{7}{8}$ -inch oak. Handles, 2x4x80 inches long with five cross bars, $1\frac{1}{2}$ x3 $\frac{1}{2}$ of oak. Bottom lined with No. 20 galvanized iron.

"American" pattern iron wheels, diameter 31 inches, tread 3 inches. Steel axle, $1\frac{1}{2}$ inches square, with malleable iron nuts.

Steel legs and braces, $1\frac{1}{2}$ x $\frac{3}{4}$ inches.

Painted bright red outside, Venetian red inside. Varnished outside.

Wheels red. Weight, 437 pounds.

Price.....\$45 00

Discount.....

PUNCHES AND SHEARS.

Made from Armor Plate.

Combination Punch and Shears.

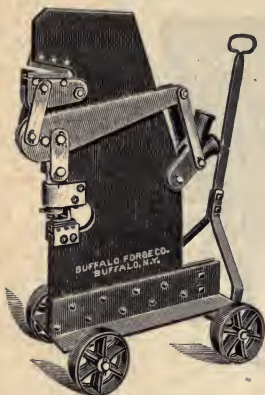


Fig. D. 644.

No. 5. On Truck.

The No. 4 B combination Punch and Shear is designed for greatest capacity and least weight, great strength being obtained by the use of armor plate, drop forged and crucible steel.

Levers are so designed that the pressure increases from beginning of stroke, reaching a maximum at the time the metal offers greatest resistance.

A high power portable Punch and Shear, built from a single plate of armor steel, with all fittings machined from dropped forgings

Specifications.

Punches $\frac{1}{2} \times \frac{1}{2}$ inch.
Cuts flat bars $6 \times \frac{1}{2}$ inch.
Cuts round bars 1 inch.
Depth of throat, 7 inches.
Punches furnished, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ inch.
Tensile strength armor plate, 75,000 pounds;
cast iron, 10,000 pounds.
No. 5, on truck, weight 850 lbs., price...\$140 00
No.5, without wheels, weight 725 lbs., price.\$125 00

Discount.....

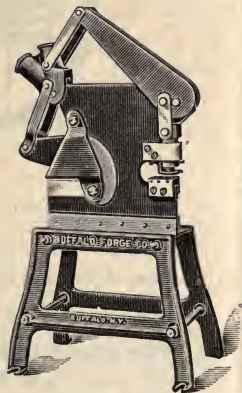


Fig. D. 645.

No. 4B. Direct Lever Type.

No.	Punches, Inches.	Cuts Round Bars.	Cuts Flat Bars.	Depth of Throat.	Weight, lbs.	Price.
4B	$\frac{1}{2} \times \frac{1}{2}$	1 in.	$3 \times \frac{1}{2}$ in.	$5 \frac{1}{2}$ in.	400	\$100 00
3B	$\frac{3}{4} \times \frac{3}{4}$	$\frac{1}{2}$ in.	$3 \times \frac{3}{4}$ in.	4 in.	350	70 00
2B	$\frac{1}{4} \times \frac{1}{4}$	$\frac{3}{8}$ in.	$2 \times \frac{1}{4}$ in.	$3 \frac{1}{2}$ in.	125	50 00

Punches furnished with No. 4B— $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ -inch.

Punches " " No. 3B— $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ -inch.

Punches " " No. 2B— $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ -inch.

Discount.....

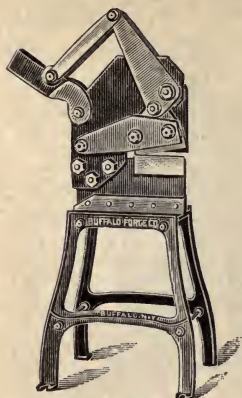
Slitting Shears.

Fig. D. 646.
No. 3.

PUNCHES AND SHEARS.

Made from Armor Plate.

This Shear is of what is known as the slitting variety, the plate clearing jaws and body of Shear so that sheets of any width may be sheared in successive cuts. Jaws are heavy blocks of crucible steel and will neither give at the points, break nor "chew" at the edges.

- No. 1. Shears No. 12 gauge sheet metal;
cuts $\frac{1}{8}$ " x 3 inch flat bars, weight 105 lbs.,
price.....\$40 00
No. 2. Shears No. 10 gauge sheet metal;
cuts $\frac{1}{8}$ " x $3\frac{1}{2}$ inch flat bars, weight 160 lbs.,
price.....60 00
No. 3. Shears No. 8 gauge sheet metal; cuts
 $\frac{1}{8}$ " x $3\frac{1}{2}$ inch flat bars, weight 200 lbs., price. 80 00

Discount.....

Angle and Tee Cutters.

The Shear is brought down squarely on the work which gives a clear cut—no ragged edges. Adaptable wherever quantities of angle bars are used.

- No. 1. Cuts angles $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " inch, weight 150
lbs., price.....\$30 00
No. 2. Cuts angles $2\frac{1}{2}$ " x $2\frac{1}{2}$ " x $\frac{1}{8}$ " inch, weight 200
lbs., price.....40 00
No. 3. Cuts tees $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " inch, weight 200
lbs., price.....40 00

Knives for cutting angles up to $2\frac{1}{2}$ " x $2\frac{1}{2}$ " x $\frac{1}{8}$ " inch can be furnished with No. 3 machine for \$6.00 extra.

Discount.....

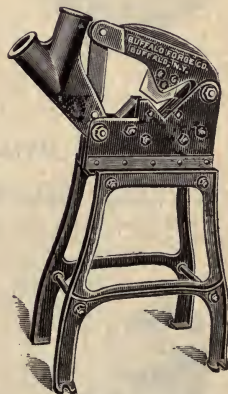


Fig. D. 647.
No. 2.

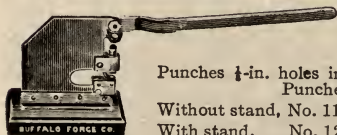


Fig. D. 648
No. 11.

Pygmy Punch No. 11.

Punches $\frac{1}{8}$ -in. holes in $\frac{1}{8}$ -in. plate. Depth of throat 4 inch.
Punches furnished $\frac{3}{8}$ " and $\frac{1}{2}$ -in.

- Without stand, No. 11, weight, 26 lbs., price.....\$15 00
With stand, No. 12, weight, 50 lbs., price.....20 00

Discount.....

HYDRAULIC HEAD PUNCH.

It is fitted with a pinion meshing into a rack cut on the ram to withdraw Punch from metal after punching.

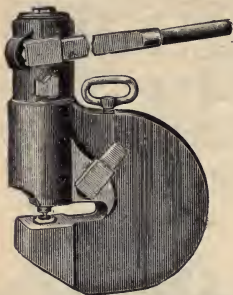


Fig. D. 649.

No.	Thickness, Inches.	Rivet, Inches.	*Gap, Inches.	Weight, Lbs.	Price.	*Gap, Inches.	Weight, Lbs.	Price.
10	1	1	2	50	\$ 70	3 1/2	55	\$ 80
11	1	1	2	65	80	3 3/4	70	90
12	1	1	2	70	100	3 3/4	105	110
13	1	1	2	85	120	3 3/4	110	130
14	1	1	2	110	150	3 3/4	140	170
15	1	1	2	150	200	3 3/4	180	220
17	1	1	2	280	250	4	350	275

*Gap refers to distance from edge of sheet to center of hole. Greater distance to order.

Discount.....

HYDRAULIC HEAD PUNCH.

This Punch is constructed similar to a Jack, being an improvement over the old style Hydraulic Screw Punch.

It is fitted with a pinion meshed into a rack cut on the ram, to save pumping the punch to and from the work.



Fig. D. 650.

No.	Thick- ness, Inches.	Punches Hole, Inches.	Distance from Edge of Sheet to Center of Hole.	Weight, Lbs.	Price.
1	1	1	1 1/4 inches.	55	\$ 60 00
2	1	1	2 "	85	85 00
2 1/2	1	1	5 "	120	100 00
3	1	1	2 1/4 "	130	120 00
3 1/4	1	1	6 "	180	140 00
3 1/2	1	1	4 1/4 "	180	140 00
4	1	1	2 3/4 "	160	140 00
6	1	1	4 1/2 "	240	165 00
8	1	1	3 1/2 "	230	165 00

Discount.....

In ordering Punches and Dies, state whether given sizes are rivet sizes or exact dimensions. Those carried in stock are for rivet sizes.

LEVER SHEARS.

The body or frame of these lever shears is cast in one piece, the space for lever, etc., being cored out. All king bolts and pins are made of the finest steel.

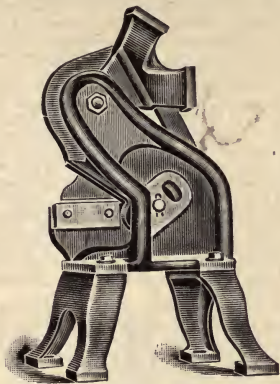


Fig. D. 651.

The knives or shear blades for shearing round and flat bars are independent of each other, and the machines are always ready for cutting without any change.

The lever works toward the front in cutting both flat and round bars.

No.	Cuts Flat Iron, Inches.	Cuts Round Iron, Diameter, Inches.	Weight, Lbs.	Price.	
				With Legs.	Without Legs.
5 A	x4	.....	250	\$32 00	\$28 00
5 B	x4	1	250	34 00	30 00
5 C	x3	.....	230	30 00	26 00
5 D	x3	$\frac{3}{4}$	230	32 00	28 00
5 E	x4	1	575	56 00	52 00
5 F	x5	.....	700	74 00	70 00
5 G	x5	1 $\frac{1}{4}$	700	80 00	76 00

Discount

SPLITTING SHEARS.

Marvel.

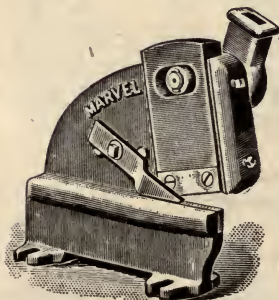


Fig. D. 652.

This machine is well made and very strong. The upper shear bearing is on an angle, and thus lessens the strain on the machine. The stripper, or hold down, is so placed that a line on material can be easily followed. It shears swinging lever either way.

NOTE—All No. 2 Shears are fitted with an attachment fixed to the end of the eccentric by which the throw of the eccentric can be changed from a long to a short throw for heavy work, or from a short to a long throw for light work, by the simple movement of a small steel pin in the attachment. This is a very simple and valuable attachment.

No.	Length of Blade.	Will Shear Sheets Any Length or Width.	Weight, Lbs.	Price.
1	4-in.	$\frac{1}{8}$ -in. thick or less	55	\$14 00
2	6-in.	$\frac{1}{4}$ -in. thick or less	200	32 00

Lever with each machine.

Discount

PUNCHES.

Combined Shear and Punch. Malleable Iron. Double Lever.

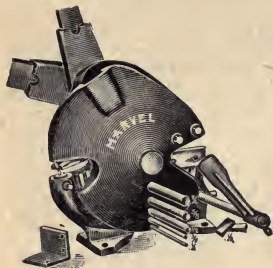


Fig. D. 653.

Blades, Punches and Dies of
best tool steel. All parts
interchangeable.

Equipped with double or compound eccentrics, one through the other, and one attached to each lever-socket. The inside lever is short, for light, quick work, and has a pin that locks both sockets, and at the same time the two eccentrics together, thus working as a single eccentric. When thus locked, the outside or long lever may also be inserted if more leverage is desired. For heavy work, the small lever is turned half around in the socket, which unlocks sockets and eccentrics, and immediately by bringing forward long lever, the power is tremendously increased, and in this manner the operator can take a long or short swing with the long lever, with a pumping motion if desired, the short lever being brought forward each time the long lever is raised, which gives the long lever a new bite in the cut or punch without moving the work. This feature is indeed a marvel.

It cuts $\frac{1}{2}$ x 2-inch flat and cuts free and true on highest stock; $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$ round with shear for each size insuring true round cut; angle iron in two cuts up to $\frac{1}{2}$ x 2-inch.

It punches $\frac{3}{8}$ -inch hole in $\frac{3}{4}$ -inch stock; $\frac{1}{2}$ -inch hole in $\frac{1}{2}$ -inch stock.

Throat 2 $\frac{1}{2}$ inches. Flat shear blades 3 $\frac{1}{2}$ inches long.

Price, complete with 2 Steel Levers, 3 Punches, 3 Dies and Gauge for flat
and round shearing (weight, 155 lbs.).....\$41 00
Price as above, and fitted with heavy iron legs (weight, 210 lbs.)..... 45 00

Discount.....

Portable Punch.

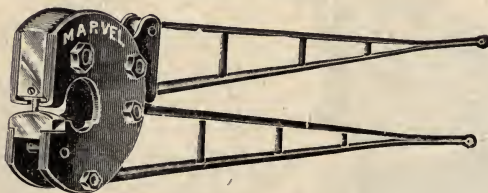


Fig. D. 654.

No. 20.

A powerful tool made entirely of steel. Easily carried in one hand. It punches sheets, bars, angles, circles, etc.; also for punching holes around the edges of sheets. Will punch a hole $\frac{3}{8}$ -inch from inside corner of angle iron to center of punch. If desired to use stationary on a bench, it can be clamped in any common bench vise, the vise jaws clamping the frame between the two lower nuts, the two nuts acting as a perfect brace. Capacity, $\frac{1}{2}$ -inch hole in $\frac{1}{2}$ -inch stock. Depth of throat 2 inches. Weight 16 pounds. Length over all, 38 inches.

Price, including one Punch and Die.....\$14 50

When not otherwise specified, $\frac{1}{2}$ -inch Punch and Die is sent with each No. 20 Punch.

Extra Punches and Dies, all sizes, from $\frac{1}{8}$ -inch to $\frac{3}{4}$ -inch, always on hand.

Discount.....

SCREW PUNCHES.

Cast Steel.

One Punch and Die furnished. When ordering specify size of hole to be punched.

These Screw Punches are made with Ratchet or Bar Head Screw same as the Forged Steel Screw Punches.

No.	Throat Depth.	CAPACITY.	Weight, Lbs.	Price, Each.	Extra Punches and Dies, Per Pair.
00 or A	1½ in.	½ in. hole in ½ in. iron	15	\$20 00	\$3 50
0 or B	1½ in.	½ in. hole in ½ in. iron	17	24 00	3 50
1 or C	1½ in.	½ in. hole in ½ in. iron	27	30 00	4 00
2 or D	2 in.	½ in. hole in ½ in. iron	40	40 00	4 00
3 or E	3 in.	½ in. hole in ½ in. iron	60	60 00	5 00
4 or G	4 in.	½ in. hole in ½ in. iron	110	80 00	5 00

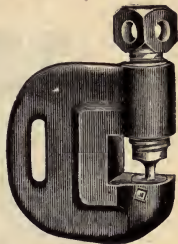


Fig. D. 655.

Discount.....

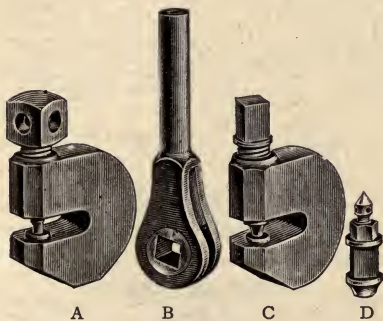


Fig. D. 656.

Forged Steel Screw Punch with Ratchet Attachment.

The Ratchet Wrench, Fig. B, is the latest and most economical tool for boiler makers' use. The handle is made proper size to fit inside 2½-inch pipe for extension of handle.

Fig. C shows Ratchet Head Screw. Fig. A Bar Head Screw.

Fig. D Drill Socket to be used with ratchet wrench for drilling.

No.	Throat Depth.	CAPACITY.	Weight, Lbs.	Price, Each.	Extra Punches and Dies.
1. (A or C)	1½ in.	½ in. hole in ½ in. iron	20	\$16 00	\$2 00 per set
2. (A or C)	2½ in.	½ in. hole in ½ in. iron	48	25 00	2 50 per set
3. (A or C)	3½ in.	½ in. hole in ½ in. iron	70	32 00	2 80 per set
4. (A or C)	4 in.	½ in. hole in ½ in. iron	100	40 00	2 80 per set

B-Ratchet Wrench, extra.....each, \$15 00

D-Drill Socket, extra.....each, 4 00

Discount.....

One Punch and Die furnished with each machine..

When ordering, specify size of hole to be punched.

MULTIPLE LEVER PUNCHES.

Marvel.



Fig. D. 657.
Nos. 10 and 11.

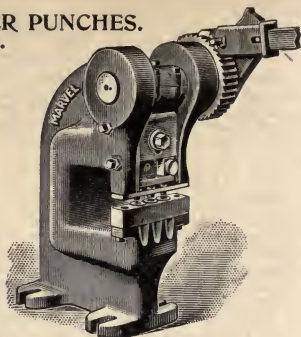


Fig. D. 658.
No. 12.

The Nos. 10 and 11 have a row of four punches in front; the No. 12 has three. One punch is used at a time. All the punches may be left in place at all times if desired. Punches are simply dropped in place, and the steel block with thumb screw can be rapidly shifted over any punch desired, and punch tightened by turning thumb screw. The slide case is hardened steel. The movable block is hardened tool steel. The die extends forward so as to be able to punch web and flange of channels, eye beams, angles, etc. Lever is used swinging either way.

No.	Thickness, Inches.	Punches, Inches.	Distance from Edge of Sheet to Center of Hole.	Weight, Lbs.	Price.
10	$\frac{1}{4}$	$\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$	4 inches	90	\$ 30 00
11	$\frac{1}{4}$	$\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$	5 inches	300	65 00
12	$\frac{1}{4}$	$\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$	6 $\frac{1}{2}$ inches	675	110 00

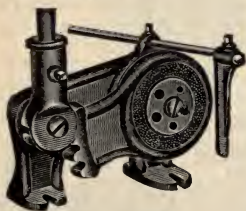


Fig. D. 659.

Discount
Price includes punches, dies and lever, complete.

ROD CUTTER.

Marvel.

Cutting dies have round openings of correct size to cut off rods and wire within the capacity of the machine, which insures good work with ends round and true.

The gearing is so placed as to remove all danger of crushing the operator's hand. The round steel lever can be instantly removed when desired.

The center of leverage is down low which lessens the pull on the bench.

No.	Cut Rods as below, and Intermediate Sizes.	Weight, Lbs.	Price complete, with Lever, Gauge and Gauge Rod.
5	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ in.	12	\$ 6 00
6	$\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ in.	35	10 00
7	$\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 in.	95	22 00

Discount

HAND TOOLS.**Riveting, Bridge Builders', Boiler Makers', Etc.****Fig. D. 660.****Boiler Makers' Riveting Hammers.**

Weight	Price, each.	Weight.	Price, each.	Weight.	Price, each.	Weight.	Price, each.
1 lb. 8 oz.	\$1 45	2 lbs.	\$1 60	2 lb. 8 oz.	\$1 85	3 lbs.	\$2 10

Discount.....**Fig. D. 661.****Bridge Builders' Riveting Hammers.**

Weight.	Face, inches.	Length, inches.	Price, each.
4 lbs.	1½ and 1½	8½	\$2 00

Discount.....**Fig. D. 662.****Napping Hammer.****Fig. D. 663.****Flogging Hammer.**

Style.	Weight.	Face.	Length.	Price, each.
Napping.....	3 lbs.	1½ inches	6 inches	\$2 00
Flogging.....	7 lbs.	1½ inches	7 inches	2 50

Discount.....**Fig. D. 664.****Plugging Hammer:**

Weight 2½ lbs., price each.....\$1 75

Discount.....**Fig. D. 665.****Sledge Hammer.**

Weight 10 to 12 lbs., price per lb. \$0 40

Discount.....

Handles extra. See index.

HAND TOOLS.

Riveting, Bridge Builders', Boiler Makers', Etc.

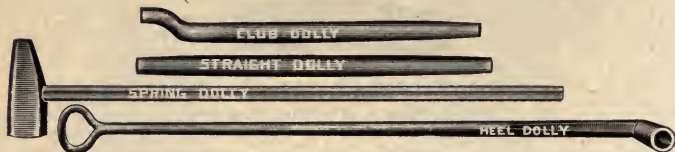


Fig. D. 666.

Riveting Dollies.

Club Dolly, length 3 feet, price, each.....	\$4 25
Straight Dolly, " 3 " " ".....	3 05
Spring Dolly, " 4½ " " ".....	6 50
Heel Dolly, " 5 " " ".....	6 00

Discount.....

Fig. D. 667.
Straight Blade
Cold Cutter.Fig. D. 668.
Cross Blade
Cold Cutter.Fig. D. 669.
Rivet Buster.

Style.	Length, inches.	Face, inches.	Price, each.
Straight Blade Cold Cutter.....	6½	1½	\$1 15
Cross Blade Cold Cutter.....	6½	1½	1 15
Rivet Buster.....	6	1½	1 15

Discount.....

Fig. D. 670.
Side Set, or Cutter.Fig. D. 671.
Handle Gouge.

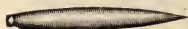
Style.	Length, inches.	Face, inches.	Price, each.
Side Set, or Cutter.....	6½	1½	\$1 15
Handle Gouge.....	6½	1½	1 25

Discount.....

Handles Extra. See index.

HAND TOOLS.

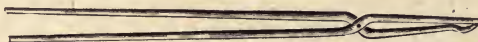
Riveting, Bridge Builders', Boiler Makers', Etc.

Fig. D. 672.
Drift Pin.Fig. D. 673.
Rivet Snap or Set.Fig. D. 674.
Backing-Out Punch.

Style.	Rivet, Size.	Weight.	Length.	Price, each.
Drift Pins.....	$\frac{1}{4}$ to 1 in.	$\frac{1}{2}$ to 1 lb.	7 inches	\$0 30
*Rivet Snaps or Sets..	$\frac{1}{4}$ to 1 in.	$\frac{3}{4}$ to 4 lb.	.....	2 00
*Backing-out Punch...	$\frac{1}{4}$ to 1 in.	3 to 4 lb.	7 inches	1 75

*Handles extra. See index.

Discount.....

Fig. D. 675.
Rivet Tongs.

Pick-up Tongs, 18 inches long, price, pair.....\$1 00

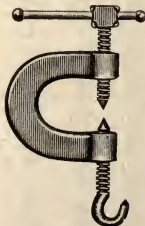
Heating Tongs, 30 inches long, price, pair.....1 00

Discount.....

Fig. D. 676.
Hand Gouge.Fig. D. 677.
Hand Chisel.Fig. D. 678.
Half Round Reamers.

Style.	For Rivets.	Length.	Price, each.
Hand Gouge.....	$\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ in.	8 inches	\$0 75
Hand Chisel (flat, cape, diamond or round point).....	.....	8 inches	75
Half Round Reamers.....	$\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{2}$ in.....	8 inches	1 25

Discount.....



Riveting Clamp.

Price, each.....\$5

Discount.....

Fig. D. 679



BOILER RIVETS.



Fig. D. 680.

Cone Head.

Fig. D. 681.

Button or Round Head.

The length of a rivet is the distance under head. 'Countersunk rivets are measured over all; all others under head to end. Rivets are now packed 200 pounds to the keg.

$\frac{3}{4}$ in. diameter to $1\frac{1}{4}$ in., inclusive, Burden's iron (base)... per lb. \$.....
 $\frac{3}{4}$ in. diameter to $1\frac{1}{4}$ in., inclusive, steel (base)..... per lb.

Extras on Rivets, per 100 Lbs. Effective October 15, 1912.

1.	$\frac{1}{2}$ in. and $\frac{3}{8}$ in. diameter.....	\$0 50
2.	$\frac{5}{8}$ in. and $\frac{1}{2}$ in. diameter.....	15
3.	Rivets larger than $1\frac{1}{4}$ inch in diameter.....	25
4.	Lengths 1 inch and shorter	50
5.	Lengths over 1 inch and under 2 inches.....	25
6.	Lengths over 5 inches.....	25
7.	Flat Head Rivets.....	25
8.	All Standard Countersunk Head Rivets.....	25
9.	Swell Neck Rivets.....	25
10.	Special heads other than our regular standards, minimum charge....	25
11.	Cold, or Hot Made Solid Die Rivets when specially specified.....	25
12.	Annealing Cold Made Rivets, $\frac{1}{2}$ inch diameter and larger.....	35
13.	Small order for miscellaneous sizes for less than two tons to parties not under contract.....	10
14.	Rivets in 100-lb. packages.....	10

Approximate Number of Rivets in 100 Pounds.

Length Rivets.		Diameter of Rivets.											
		1-8	3-16	1-4	5-16	3-8	7-16	1-2	5-8	11-16	3-4	7-8	1
1	17500	15900	8000	5100	3200	1900	.....	.....	.....	.....	.....	.....	.....
	16000	13800	7000	4500	2900	1800	.....	.....	.....	.....	.....	.....	.....
1 1/4	14400	12200	6300	4100	2373	1476	1103	642	.....	.....	.....	.....	.....
	13500	10900	5700	3700	2190	1371	1030	604	.....	.....	.....	.....	.....
1 1/2	12600	9800	5200	3400	2034	1280	968	571	400	345	.....	.....	.....
	11600	9000	4700	3100	1898	1200	910	541	382	322	208	.....	.....
1 3/4	10800	8300	4400	2900	1780	1129	862	514	365	311	206	.....	.....
	10000	7600	4100	2700	1675	1066	815	489	350	295	204	.....	.....
1 3/8	9300	7100	4000	2500	1582	1010	776	462	335	284	201	.....	.....
	8700	.....	3800	2300	1498	960	740	446	324	275	199	132	.....
1 3/8	8100	6300	3500	2200	1424	914	707	428	311	266	192	128	.....
	.....	.....	3400	2000	1356	872	672	411	302	257	185	124	.....
2	.....	5600	3000	1900	1295	834	648	395	293	249	178	120	.....
	.....	.....	.....	.....	1238	800	623	381	285	240	172	116	.....
2 1/4	.....	5000	2800	1890	1187	768	599	367	277	233	167	112	.....
	.....	.....	.....	.....	1139	738	577	354	269	226	162	108	.....
2 1/2	.....	4600	2500	1700	1095	711	556	343	261	219	157	104	.....
	.....	.....	.....	.....	1052	687	537	332	253	212	152	100	.....
2 3/4	.....	4200	2300	1500	1017	662	519	321	245	206	148	96	.....
	.....	.....	.....	.....	982	636	503	311	237	201	144	92	.....
3	.....	3900	2200	1400	949	611	487	302	230	196	140	88	.....
	.....	3600	2000	1300	890	581	459	285	218	186	132	85	.....
3 1/4	.....	3400	1900	1200	837	548	433	270	208	177	126	82	.....
	.....	3200	1800	1175	791	519	411	257	198	168	120	79	.....
3 1/2	.....	.....	.....	.....	.....	.....	395	250	195	165	119	.....	.....
	.....	3000	1700	1100	749	400	390	244	189	161	115	77	.....

RIVETS. Sheet, Tank and Small Rivets of all sizes. Iron—In Bulk.

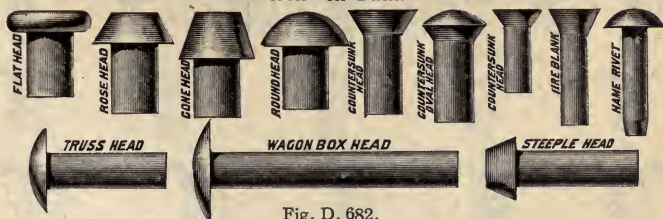


Fig. D. 682.

Old Standard Wire Gauge.

Revised Price List January 8, 1904. Price Per Pound—Any Style Head.

Diam. of Rivet or Size of Wire.	Length of Rivets—Inches.												
	1 in. & longer	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{5}{8}$, $\frac{3}{4}$	$\frac{11}{8}$	$\frac{7}{4}$	$\frac{13}{8}$	$\frac{3}{2}$	$\frac{15}{8}$	$\frac{7}{4}$	$\frac{9}{4}$	$\frac{1}{2}$	$\frac{7}{8}$
$\frac{7}{16}$	19	19 $\frac{1}{2}$	19 $\frac{1}{2}$	20	...	...	...	...	...	...	...	...	...
$\frac{1}{4}$	19	19 $\frac{1}{2}$	19 $\frac{1}{2}$	20	21	...	...	...	...	...	...	...	...
$\frac{3}{8}$	19 $\frac{1}{2}$	20	20	20 $\frac{1}{2}$	21	21	...	...	...	...	...	...	...
$\frac{1}{2}$	19 $\frac{1}{2}$	20	20	20 $\frac{1}{2}$	21	22	22	22	...	...	...	...	...
No. 1.....	20	20 $\frac{1}{2}$	20 $\frac{1}{2}$	21	22	23	23	23	23	...	...	...	...
No. 2.....	20	20 $\frac{1}{2}$	20 $\frac{1}{2}$	21	22	23	23	23	23	24	...	...	...
No. 3.....	20	20 $\frac{1}{2}$	20 $\frac{1}{2}$	21	22	23	23	23	23	24	24	24	...
$\frac{3}{4}$	20	20 $\frac{1}{2}$	20 $\frac{1}{2}$	21	22	23	23	23	23	24	24	24	25
No. 4.....	21	21 $\frac{1}{2}$	21 $\frac{1}{2}$	22	23	24	24	24	24	24	24	24	25
No. 5.....	21	21 $\frac{1}{2}$	21 $\frac{1}{2}$	22	23	24	24	24	24	25	26	26	27
No. 6.....	21	21 $\frac{1}{2}$	21 $\frac{1}{2}$	22	23	24	24	25	25	26	26	27	28
$\frac{15}{16}$	21	21 $\frac{1}{2}$	21 $\frac{1}{2}$	22	23	24	24	25	25	26	26	27	28
No. 7.....	21	21 $\frac{1}{2}$	22	23	24	24	24	25	25	26	26	27	28
No. 8.....	22	22 $\frac{1}{2}$	22 $\frac{1}{2}$	23	24	25	25	26	26	27	27	28	29
No. 9.....	23	23 $\frac{1}{2}$	23 $\frac{1}{2}$	24	25	26	26	27	27	29	29	29	30
No. 10.....	24	24 $\frac{1}{2}$	24 $\frac{1}{2}$	25	26	27	28	29	31	33	34	34	36
No. 11.....	25	25 $\frac{1}{2}$	25 $\frac{1}{2}$	26	28	30	32	33	34	36	37	37	39
No. 12.....	26	26 $\frac{1}{2}$	26 $\frac{1}{2}$	27	30	32	34	35	36	38	40	41	42
No. 13.....	30	30 $\frac{1}{2}$	30 $\frac{1}{2}$	31	33	36	39	40	41	43	45	46	47
No. 14.....	32	32 $\frac{1}{2}$	32 $\frac{1}{2}$	33	36	41	44	46	51	56	58	61	64

Rivets made from smaller wire than No. 14, all lengths, list 80 cents per pound; $\frac{3}{8}$ diameter, list price No. 13; $\frac{1}{2}$ diameter, list price No. 5; $\frac{5}{8}$ diameter, list price No. 8; $\frac{3}{4}$ diameter, list price No. 11; $\frac{7}{8}$ diameter, list price No. 2.

List Extras.

For Shoulder and Pointed Rivets, add two cents per pound to list price for each specialty, excepting Pointed Hame, Caster and Sucker Rod. Intermediate lengths and diameters take list price of nearest smaller size. For Tinnners' and Coopers' Rivets, for Oval Head and Shoulder or Extra Length Rivets, add 2 cents per pound to list price for each specialty.

Net Extras.

For Tin or Copper Plated, add 1 cent per pound to net price; for Metallic Tinning, add 2 $\frac{1}{2}$ cents per pound to net price.

List Rebates.

For 25 and 50 pound boxes, deduct 2 cents, and for 100 and 200 pound kegs, deduct 4 cents per pound from list price. Packed as follows: 5 pound boxes, 100 pounds in case; in bulk, 50, 25 and 10 pounds in box, and 100 and 200 pounds in keg. Above prices are for 10 pound and 5 pound boxes.

Discount.....

TINNERS' IRON RIVETS.

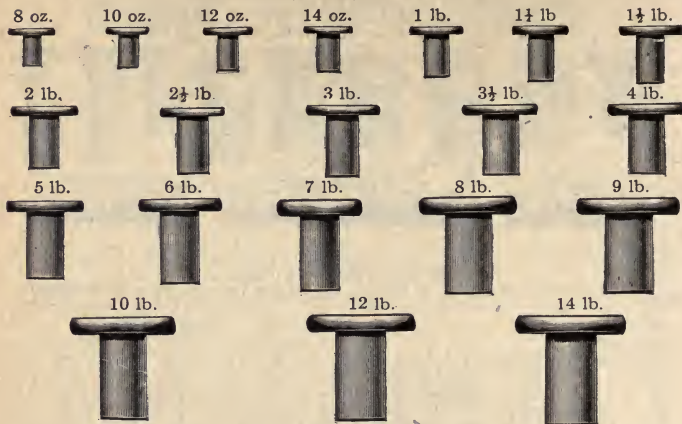


Fig. D. 683.

Packed in Papers of 1,000 each.
Price per 1,000.

Size.		Black.	Tinned.	Tin Plated.	In Bulk Price Per Lb.
		Black.	Tinned.	Tin Plated.	Black.
8	oz.	\$0 22	\$0 31	\$0 26	\$0 42
10	"	24	35	29	38
12	"	26	39	32	35
14	"	28	43	35	33
1	lb.	29	47	37	30
1½	"	32	54	42	27
1¾	"	37	64	49	26
2	"	41	72	55	25
2½	"	44	79	59	24
3	"	56	1 00	75	24
3½	"	62	1 15	85	23
4	"	72	1 34	99	23
4½	"	79	1 49	1 09	22
5	"	1 00	1 88	1 38	22
6	"	1 12	2 17	1 57	21
7	"	1 31	2 54	1 84	21
8	"	1 50	2 90	2 10	21
9	"	1 68	3 26	2 36	21
10	"	1 77	3 52	2 52	20
12	"	2 06	4 16	2 96	19½
14	"	2 40	4 85	3 45	19½
16	"	2 77	5 57	3 97	19½

List Extras.

For Oval or Countersunk Heads, Shoulder and Pointed, or extra length Rivets, add 10 cents per 1,000 to list price for each specialty.

Discount.

COACH OR LAG SCREWS.



Fig. D. 685.

List in effect November 12, 1908.

Price Per 100.

Length, Ins.	$\frac{1}{4}$ and $\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$ and $\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
1 $\frac{1}{2}$	\$2 25	\$2 70	\$3 15	\$ 3 75	.....	.....	.....	.....
2.....	2 45	2 96	3 47	4 11	\$ 6 00	.....	.....	.....
2 $\frac{1}{2}$	2 65	3 22	3 79	4 47	6 50	\$ 9 20	.....	.....
3.....	2 85	3 48	4 11	4 83	7 00	9 90	\$15 00	.....
3 $\frac{1}{2}$	3 05	3 74	4 43	5 19	7 50	10 60	16 00	\$22 00
4.....	3 25	4 00	4 75	5 55	8 00	11 30	17 00	23 30
4 $\frac{1}{2}$	3 45	4 26	5 07	5 91	8 50	12 00	18 00	24 60
5.....	3 65	4 52	5 39	6 27	9 00	12 70	19 00	25 90
5 $\frac{1}{2}$	3 85	4 78	5 71	6 63	9 50	13 40	20 00	27 20
6.....	4 05	5 04	6 03	6 99	10 00	14 10	21 00	28 50
6 $\frac{1}{2}$	4 25	5 30	6 35	7 35	10 50	14 80	22 00	29 80
7.....	4 45	5 56	6 67	7 71	11 00	15 50	23 00	31 10
7 $\frac{1}{2}$	4 65	5 82	6 99	8 07	11 50	16 20	24 00	32 40
8.....	4 85	6 08	7 31	8 43	12 00	16 90	25 00	33 70
9.....	5 25	6 60	7 95	9 15	13 00	18 30	27 00	36 30
10.....	5 65	7 12	8 59	9 87	14 00	19 70	29 00	38 90
11.....	6 05	7 64	9 23	10 59	15 00	21 10	31 00	41 50
12.....	6 45	8 16	9 87	11 31	16 00	22 50	33 00	44 10

Hexagon Heads, 10 per cent. Extra. Tee Heads, 20 per cent. Extra.
Discount.....

EXPANSION BOLTS AND SHIELDS.



Fig. D. 686.



Fig. D. 687.

List Per Hundred, Complete With Square Head Lag Screws.

Length, Ins.	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
1 $\frac{1}{2}$	\$10 13	11 60	.....	.....	.....	.....	.....	.....
2.....	10 85	11 65	.....	.....	.....	.....	.....	.....
2 $\frac{1}{2}$	11 00	11 85	15 90	20 30	24 15	31 70	48 30	.....
3.....	11 25	12 00	16 10	20 50	24 45	32 10	48 85	.....
4.....	11 50	12 35	16 40	20 80	25 35	32 90	50 00	.....
5.....	11 85	12 65	16 90	21 15	25 90	33 75	51 05	.....
6.....	12 20	13 00	17 35	21 50	26 45	34 60	52 20	68 90
7.....	.....	13 30	17 65	21 80	27 00	35 40	53 30	70 00
8.....	.....	.....	18 00	22 15	27 55	36 25	54 45	71 10
9.....	.....	.....	.....	22 50	28 10	37 10	55 55	72 20
10.....	.....	.....	.....	.....	.....	37 95	56 65	73 30
11.....	.....	.....	.....	.....	.....	38 80	57 75	74 40
12.....	.....	.....	.....	.....	.....	39 60	58 90	75 55

Discount.....

SHIELDS ONLY (Malleable.)

Price Per 100.

$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	1 in.
\$9 40	10 50	13 35	17 75	22 00	27 80	39 95	53 30

Discount.....

ROUND AND FLAT HEAD IRON SCREWS.



Fig. D. 688.

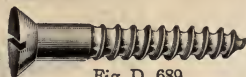


Fig. D. 689.

List of July 22, 1903.

Price Per Gross.

10	1/4 Inch. No.	1/2 Inch. No.	3/4 Inch. No.	1 Inch. No.	1 1/4 Inch. No.	1 1/2 Inch. No.	2 Inch. No.	2 1/2 Inch. No.	3 Inch. No.	3 1/2 Inch. No.	4 Inch. No.	4 1/2 Inch. No.	5 Inch. No.	6 Inch. No.	7 Inch. No.	8 Inch. No.	9 Inch. No.	10 Inch. No.
	0.. \$0 72	0.. \$0 72	1.. \$0 72	1.. \$0 72	2.. \$0 72	2.. \$0 72	3.. \$0 72	3.. \$0 72	4.. \$0 72	4.. \$0 72	5.. \$0 72	5.. \$0 72	6.. \$0 72	6.. \$0 72	7.. \$0 72	7.. \$0 72	8.. \$0 72	8.. \$0 72
	1.. 72	1.. 72	2.. 72	2.. 72	3.. 72	3.. 72	4.. 72	4.. 72	5.. 72	5.. 72	6.. 72	6.. 72	7.. 72	7.. 72	8.. 72	8.. 72	9.. 72	9.. 72
	2.. 72	2.. 72	3.. 72	3.. 72	4.. 72	4.. 72	5.. 72	5.. 72	6.. 72	6.. 72	7.. 72	7.. 72	8.. 72	8.. 72	9.. 72	9.. 72	10.. 72	10.. 72
	3.. 72	3.. 72	4.. 72	4.. 72	5.. 72	5.. 72	6.. 72	6.. 72	7.. 72	7.. 72	8.. 72	8.. 72	9.. 72	9.. 72	10.. 72	10.. 72	11.. 72	11.. 72
	4.. 72	4.. 72	5.. 72	5.. 72	6.. 72	6.. 72	7.. 72	7.. 72	8.. 72	8.. 72	9.. 72	9.. 72	10.. 72	10.. 72	11.. 72	11.. 72	12.. 72	12.. 72
		5.. 75	6.. 80	6.. 80	7.. 84	7.. 84	8.. 86	8.. 86	9.. 88	9.. 88	10.. 90	10.. 90	11.. 90	11.. 90	12.. 90	12.. 90	13.. 90	13.. 90
		6.. 78	7.. 84	7.. 84	8.. 90	8.. 90	9.. 92	9.. 92	10.. 94	10.. 94	11.. 96	11.. 96	12.. 96	12.. 96	13.. 96	13.. 96	14.. 96	14.. 96
		7.. 82	8.. 90	8.. 90	9.. 96	9.. 96	10.. 98	10.. 98	11.. 100	11.. 100	12.. 102	12.. 102	13.. 102	13.. 102	14.. 102	14.. 102	15.. 102	15.. 102
		8.. 88	9.. 94	9.. 94	10.. 1 05	10.. 1 05	11.. 1 07	11.. 1 07	12.. 1 09	12.. 1 09	13.. 1 11	13.. 1 11	14.. 1 11	14.. 1 11	15.. 1 11	15.. 1 11	16.. 1 11	16.. 1 11
		9.. 94	10.. 1 05	10.. 1 05	11.. 1 10	11.. 1 10	12.. 1 12	12.. 1 12	13.. 1 14	13.. 1 14	14.. 1 16	14.. 1 16	15.. 1 16	15.. 1 16	16.. 1 16	16.. 1 16	17.. 1 16	17.. 1 16
			11.. 1 10	11.. 1 10	12.. 1 12	12.. 1 12	13.. 1 14	13.. 1 14	14.. 1 16	14.. 1 16	15.. 1 18	15.. 1 18	16.. 1 18	16.. 1 18	17.. 1 18	17.. 1 18	18.. 1 18	18.. 1 18
			12.. 1 20	12.. 1 20	13.. 1 22	13.. 1 22	14.. 1 24	14.. 1 24	15.. 1 26	15.. 1 26	16.. 1 28	16.. 1 28	17.. 1 28	17.. 1 28	18.. 1 28	18.. 1 28	19.. 1 28	19.. 1 28
	1 1/4 Inch. No.	1 1/2 Inch. No.	2 Inch. No.	2 1/2 Inch. No.	3 Inch. No.	3 1/2 Inch. No.	4 Inch. No.	4 1/2 Inch. No.	5 Inch. No.	5 1/2 Inch. No.	6 Inch. No.	6 1/2 Inch. No.	7 Inch. No.	7 1/2 Inch. No.	8 Inch. No.	8 1/2 Inch. No.	9 Inch. No.	9 1/2 Inch. No.
	3.. \$0 88	3.. \$0 98	4.. 1 05	4.. 1 05	5.. 1 10	5.. 1 10	6.. 1 15	6.. 1 15	7.. 1 20	7.. 1 20	8.. 1 25	8.. 1 25	9.. 1 30	9.. 1 30	10.. 1 35	10.. 1 35	11.. 1 35	11.. 1 35
	4.. 92	4.. 1 05	5.. 1 10	5.. 1 10	6.. 1 15	6.. 1 15	7.. 1 20	7.. 1 20	8.. 1 25	8.. 1 25	9.. 1 30	9.. 1 30	10.. 1 35	10.. 1 35	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35
	5.. 98	5.. 1 10	6.. 1 15	6.. 1 15	7.. 1 20	7.. 1 20	8.. 1 25	8.. 1 25	9.. 1 30	9.. 1 30	10.. 1 35	10.. 1 35	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35	13.. 1 35	13.. 1 35
	6.. 1 05	6.. 1 10	7.. 1 15	7.. 1 15	8.. 1 20	8.. 1 20	9.. 1 25	9.. 1 25	10.. 1 30	10.. 1 30	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35	13.. 1 35	13.. 1 35	14.. 1 35	14.. 1 35
	7.. 1 10	7.. 1 15	8.. 1 20	8.. 1 20	9.. 1 25	9.. 1 25	10.. 1 30	10.. 1 30	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35	13.. 1 35	13.. 1 35	14.. 1 35	14.. 1 35	15.. 1 35	15.. 1 35
	8.. 1 15	8.. 1 20	9.. 1 25	9.. 1 25	10.. 1 30	10.. 1 30	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35	13.. 1 35	13.. 1 35	14.. 1 35	14.. 1 35	15.. 1 35	15.. 1 35	16.. 1 35	16.. 1 35
	9.. 1 20	9.. 1 25	10.. 1 30	10.. 1 30	11.. 1 35	11.. 1 35	12.. 1 35	12.. 1 35	13.. 1 35	13.. 1 35	14.. 1 35	14.. 1 35	15.. 1 35	15.. 1 35	16.. 1 35	16.. 1 35	17.. 1 35	17.. 1 35
	10.. 1 30	10.. 1 35	11.. 1 40	11.. 1 40	12.. 1 45	12.. 1 45	13.. 1 45	13.. 1 45	14.. 1 45	14.. 1 45	15.. 1 45	15.. 1 45	16.. 1 45	16.. 1 45	17.. 1 45	17.. 1 45	18.. 1 45	18.. 1 45
	11.. 1 40	11.. 1 45	12.. 1 50	12.. 1 50	13.. 1 55	13.. 1 55	14.. 1 55	14.. 1 55	15.. 1 55	15.. 1 55	16.. 1 55	16.. 1 55	17.. 1 55	17.. 1 55	18.. 1 55	18.. 1 55	19.. 1 55	19.. 1 55
	12.. 1 55	12.. 1 55	13.. 1 60	13.. 1 60	14.. 1 65	14.. 1 65	15.. 1 65	15.. 1 65	16.. 1 65	16.. 1 65	17.. 1 65	17.. 1 65	18.. 1 65	18.. 1 65	19.. 1 65	19.. 1 65	20.. 1 65	20.. 1 65
	13.. 1 70	13.. 1 65	14.. 1 70	14.. 1 70	15.. 1 75	15.. 1 75	16.. 1 75	16.. 1 75	17.. 1 75	17.. 1 75	18.. 1 75	18.. 1 75	19.. 1 75	19.. 1 75	20.. 1 75	20.. 1 75	21.. 1 75	21.. 1 75
	14.. 1 90	14.. 1 80	15.. 1 85	15.. 1 85	16.. 1 90	16.. 1 90	17.. 1 90	17.. 1 90	18.. 1 90	18.. 1 90	19.. 1 90	19.. 1 90	20.. 1 90	20.. 1 90	21.. 1 90	21.. 1 90	22.. 1 90	22.. 1 90
	*15.. 2 15	*13.. 1 80	13.. 2 00	13.. 2 00	14.. 2 05	14.. 2 05	15.. 2 05	15.. 2 05	16.. 2 05	16.. 2 05	17.. 2 05	17.. 2 05	18.. 2 05	18.. 2 05	19.. 2 05	19.. 2 05	20.. 2 05	20.. 2 05
	16.. 2 50	14.. 2 00	15.. 2 05	15.. 2 05	16.. 2 10	16.. 2 10	17.. 2 10	17.. 2 10	18.. 2 10	18.. 2 10	19.. 2 10	19.. 2 10	20.. 2 10	20.. 2 10	21.. 2 10	21.. 2 10	22.. 2 10	22.. 2 10
	17.. 2 75	15.. 2 35	16.. 2 40	16.. 2 40	17.. 2 45	17.. 2 45	18.. 2 45	18.. 2 45	19.. 2 45	19.. 2 45	20.. 2 45	20.. 2 45	21.. 2 45	21.. 2 45	22.. 2 45	22.. 2 45	23.. 2 45	23.. 2 45
	18.. 3 30	16.. 2 80	17.. 2 85	17.. 2 85	18.. 2 90	18.. 2 90	19.. 2 90	19.. 2 90	20.. 2 90	20.. 2 90	21.. 2 90	21.. 2 90	22.. 2 90	22.. 2 90	23.. 2 90	23.. 2 90	24.. 2 90	24.. 2 90
	5 20.. 4 00	17.. 3 20	18.. 3 25	18.. 3 25	19.. 3 30	19.. 3 30	20.. 3 30	20.. 3 30	21.. 3 30	21.. 3 30	22.. 3 30	22.. 3 30	23.. 3 30	23.. 3 30	24.. 3 30	24.. 3 30	25.. 3 30	25.. 3 30
	22.. 4 80	18.. 3 80	19.. 3 85	19.. 3 85	20.. 3 90	20.. 3 90	21.. 3 90	21.. 3 90	22.. 3 90	22.. 3 90	23.. 3 90	23.. 3 90	24.. 3 90	24.. 3 90	25.. 3 90	25.. 3 90	26.. 3 90	26.. 3 90
	24.. 5 40	20.. 4 30	21.. 4 35	21.. 4 35	22.. 4 40	22.. 4 40	23.. 4 40	23.. 4 40	24.. 4 40	24.. 4 40	25.. 4 40	25.. 4 40	26.. 4 40	26.. 4 40	27.. 4 40	27.. 4 40	28.. 4 40	28.. 4 40
		22.. 5 10	23.. 5 15	23.. 5 15	24.. 5 20	24.. 5 20	25.. 5 20	25.. 5 20	26.. 5 20	26.. 5 20	27.. 5 20	27.. 5 20	28.. 5 20	28.. 5 20	29.. 5 20	29.. 5 20	30.. 5 20	30.. 5 20
		24.. 5 90	25.. 5 95	25.. 5 95	26.. 6 00	26.. 6 00	27.. 6 00	27.. 6 00	28.. 6 00	28.. 6 00	29.. 6 00	29.. 6 00	30.. 6 00	30.. 6 00	31.. 6 00	31.. 6 00	32.. 6 00	32.. 6 00
	3 Inch. No.	3 1/2 Inch. No.	4 Inch. No.	4 1/2 Inch. No.	5 Inch. No.	5 1/2 Inch. No.	6 Inch. No.	6 1/2 Inch. No.	7 Inch. No.	7 1/2 Inch. No.	8 Inch. No.	8 1/2 Inch. No.	9 Inch. No.	9 1/2 Inch. No.	10 Inch. No.	10 1/2 Inch. No.	11 Inch. No.	11 1/2 Inch. No.
	6.. \$2 95	8.. \$3 90	8.. \$4 90	9.. 5 10	10.. 5 20	10.. 5 20	11.. 5 30	11.. 5 30	12.. 5 40	12.. 5 40	13.. 5 50	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20
	7.. 3 00	9.. 4 00	9.. 5 10	10.. 5 20	10.. 5 20	11.. 5 30	11.. 5 30	12.. 5 40	12.. 5 40	13.. 5 50	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30
	8.. 3 05	10.. 4 10	10.. 5 20	11.. 5 30	11.. 5 30	12.. 5 40	12.. 5 40	13.. 5 50	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30	17.. 6 30	18.. 6 40
	9.. 3 10	11.. 4 20	11.. 5 30	12.. 5 40	12.. 5 40	13.. 5 50	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30	17.. 6 30	18.. 6 40	18.. 6 40	19.. 6 50
	10.. 3 15	12.. 4 30	12.. 5 40	13.. 5 50	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30	17.. 6 30	18.. 6 40	18.. 6 40	19.. 6 50	19.. 6 50	20.. 7 00
	11.. 3 20	13.. 4 40	13.. 5 50	14.. 6 00	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30	17.. 6 30	18.. 6 40	18.. 6 40	19.. 6 50	19.. 6 50	20.. 7 00	20.. 7 00	21.. 7 10
	12.. 3 30	14.. 4 50	14.. 6 00	15.. 6 10	15.. 6 10	16.. 6 20	16.. 6 20	17.. 6 30	17.. 6 30	18.. 6 40	18.. 6 40	19.. 6 50	19.. 6 50	20.. 7 00	20.. 7 00	21.. 7 10	21.. 7 10	22.. 7 20
	13.. 3 40	*15.. 4 75	15.. 6 20	16.. 6 30	16.. 6 30	17.. 6 40	17.. 6 40	18.. 6 50	18.. 6 50	19.. 7 00	19.. 7 00	20.. 7 10	20.. 7 10	21.. 7 20	21.. 7 20	22.. 7 30	22.. 7 30	23.. 7 40
	14.. 3 50	16.. 4 95	*16.. 6 50	17.. 7 00	17.. 7 00	18.. 7 10	18.. 7 10	19.. 7 20	19.. 7 20	20.. 7 30	20.. 7 30	21.. 7 40	21.. 7 40	22.. 7 50	22.. 7 50	23.. 8 00	23.. 8 00	24.. 8 10
	15.. 3 80	17.. 5 40	17.. 7 00	18.. 7 10	18.. 7 10	19.. 7 20	19.. 7 20	20.. 7 30	20.. 7 30	21.. 7 40	21.. 7 40	22.. 7 50	22.. 7 50	23.. 8 00	23.. 8 00	24.. 8 10	24.. 8 10	25.. 8 20
	16.. 4 20	18.. 6 15	18.. 7 20	19.. 7 30	19.. 7 30	20.. 7 40	20.. 7 40	21.. 7 50	21.. 7 50	22.. 8 00	22.. 8 00	23.. 8 10	23.. 8 10	24.. 8 20	24.. 8 20	25.. 8 30	25.. 8 30	26.. 8 40
	*17.. 4 80	20.. 7 30	20.. 8 40	21.. 8 50	21.. 8 50	22.. 9 00	22.. 9 00	23.. 9 10	23.. 9 10	24.. 9 20	24.. 9 20	25.. 9 30	25.. 9 30	26.. 9 40	26.. 9 40	27.. 9 50	27.. 9 50	28.. 10 00
	18.. 5 50	22.. 8 70	22.. 9 80	23.. 9 90	23.. 9 90	24.. 10 00	24.. 10 00	25.. 10 10	25.. 10 10	26.. 10 20	26.. 10 20	27.. 10 30	27.. 10 30	28.. 10 40	28.. 10 40	29.. 10 50	29.. 10 50	30.. 11 00
	2																	

Fig. D. 691.

1. Price Per Gross.

[illegible]

The following variety of Screws are invoiced from this list at varying discounts: Flat, Round, Fillister and Oval Head Screws.

Discount

IRON MACHINE SCREWS.

Fig. D. 692.
Flat Head.Fig. D. 693.
Round Head.Fig. D. 694.
Fillister Head.

List Nov. 18, 1912.

Price Per Gross.

THREADS PER INCH.

	48 56 64	48 56	32, 36, 40		30 32 36	30 32	30 32 36	24, 30, 32		20 24	18 20 24	16, 18, 20		16 18	14 16 18	14 16	13
No.	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	30	34
In.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
$\frac{1}{8}$	30	30	30	35	35	40	40	...	...	...	...	...	...	...	...	...	...
$\frac{1}{4}$	30	30	30	35	35	40	40	60	60	...	...	...	...	...	...	...	...
$\frac{3}{8}$	30	30	30	35	35	40	40	60	60	70	85	...	...	...	...	...	...
$\frac{1}{2}$	32	32	32	37	37	44	44	65	65	75	90	115	...	...	...	...	...
$\frac{5}{8}$	32	32	32	37	37	44	44	65	65	75	90	115	150	190	230	...	...
$\frac{3}{4}$	34	34	34	39	39	48	48	70	70	80	95	120	160	200	240	...	...
$\frac{7}{8}$	34	34	34	39	39	48	48	70	70	80	95	120	160	200	240	...	...
1	37	37	37	42	42	52	52	75	75	85	100	125	170	210	250	...	...
$1\frac{1}{8}$	37	37	37	42	42	52	52	75	75	85	100	125	170	210	250	...	...
$1\frac{1}{4}$	41	41	41	46	46	...	...	...	...	...	...	...	...	...	...	...	...
$1\frac{3}{8}$	41	41	41	46	46	56	56	80	80	90	105	130	180	220	260	400	510
$1\frac{1}{2}$	45	45	45	50	50	...	...	...	...	...	...	...	...	...	...	...	...
$1\frac{3}{4}$	45	45	45	50	50	60	60	85	85	95	115	140	190	230	270	425	585
2	...	...	50	55	55	...	...	...	...	...	...	...	...	...	...	...	...
$2\frac{1}{8}$	...	...	50	55	55	65	65	90	90	100	125	150	200	240	280	450	660
$2\frac{1}{4}$	...	...	55	60	60	70	70	100	100	110	135	160	220	260	300	500	700
$2\frac{1}{2}$	...	...	60	65	65	75	75	110	110	120	145	175	240	280	320	525	735
$2\frac{3}{8}$	...	...	65	70	70	80	80	120	120	130	155	190	260	300	340	575	800
$2\frac{1}{2}$	...	...	70	75	75	85	85	130	130	140	165	210	280	320	360	600	800
$2\frac{5}{8}$	...	...	80	85	85	95	95	140	140	150	175	230	300	340	380	635	...
$2\frac{3}{4}$	...	...	90	95	95	105	105	150	150	160	185	250	320	360	420	665	860
3	...	...	100	105	105	115	115	160	160	170	200	270	340	380	440	700	...
$3\frac{1}{8}$	...	...	110	115	115	125	125	170	170	180	220	290	360	400	460	735	940
$3\frac{1}{4}$	...	...	...	125	125	145	145	190	190	200	220	260	330	400	440	800	1030
$3\frac{1}{2}$	...	...	...	...	...	165	165	220	220	250	280	350	440	490	530	890	1150
$3\frac{3}{4}$	...	...	...	...	...	190	190	250	250	290	320	400	490	540	590	985	...
4	...	...	...	...	...	230	230	290	290	350	380	450	560	600	740	1100	...
$4\frac{1}{8}$	...	...	...	...	...	...	...	330	330	425	450	550	650	700	880	1300	...
$4\frac{1}{4}$	...	...	...	...	...	...	...	375	375	500	525	650	750	850	1010	1500	...
$4\frac{1}{2}$	...	...	...	...	...	...	...	...	...	...	600	750	850	925	1220	1750	...
$4\frac{3}{4}$	...	...	...	...	...	...	...	...	...	...	675	850	960	1025	1350	2050	...

Discount.....

BRASS MACHINE SCREWS.

Fig. D. 695.
Flat Head.Fig. D. 696.
Round Head.Fig. D. 697.
Fillister Head.

List Nov. 18. 1912.

Price Per Gross.

OUR STANDARD THREADS PER INCH.

	48 56 64	48 56	32, 36, 40		30 32 36	30 32	30 32 36	24, 30, 32		20 24	18 20 24	16, 18, 20		16 18	14 16 18	14 16	13
No.	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	30	34
In.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
$\frac{1}{8}$	32	32	36	46	46	70	70	...	...	...	...	...	...	...	...	...	...
$\frac{1}{4}$	32	32	36	46	46	70	70	100	100	...	...	...	...	...	...	...	...
$\frac{3}{8}$	34	34	38	49	49	75	75	105	105	135	175	...	...	...	...	...	...
$\frac{1}{2}$	36	36	40	52	52	80	80	110	110	145	185	290	370	460	550	...	...
$\frac{5}{8}$	38	38	42	55	55	85	85	115	115	155	200	305	390	480	560	...	...
$\frac{3}{4}$	40	40	44	58	58	90	90	125	125	165	215	320	410	500	575	...	...
$\frac{7}{8}$	43	43	47	62	62	95	95	135	135	175	230	335	430	525	630	...	...
1	46	46	50	66	66	100	100	145	145	185	245	350	450	550	650	...	...
$1\frac{1}{8}$	49	49	53	70	70	...	...	...	...	...	...	...	...	...	...	...	...
$1\frac{1}{4}$	52	52	56	74	74	110	110	165	165	205	275	380	490	600	670	...	1575
$1\frac{1}{2}$	55	55	59	78	78	...	...	...	...	...	...	...	...	...	...	...	...
$1\frac{3}{4}$	58	58	62	82	82	120	120	185	185	225	305	410	530	650	740	...	1710
2	...	...	65	86	86	...	...	...	...	...	...	...	...	...	...	...	...
$2\frac{1}{8}$	...	...	70	90	90	130	130	205	205	245	335	440	570	700	850	1575	1850
$2\frac{1}{4}$	...	...	80	105	105	145	145	220	220	265	355	465	600	750	900	...	...
$2\frac{1}{2}$	...	...	90	120	120	160	160	235	235	285	375	490	630	800	990	1875	2210
$2\frac{3}{4}$	...	...	100	135	135	175	175	250	250	305	395	520	660	850	1150	...	...
3	...	...	110	150	150	190	190	265	265	325	415	550	690	900	1200	2250	2665
$3\frac{1}{8}$	...	...	125	170	170	210	210	285	285	350	440	585	730	950	...	...	...
$3\frac{1}{4}$	...	...	140	190	190	230	230	305	305	375	465	620	770	1000	1270	2425	2810
$3\frac{1}{2}$	...	...	155	210	210	250	250	325	325	400	490	660	810	1050	...	...	...
$3\frac{3}{4}$	...	...	170	230	230	270	270	345	345	425	515	700	860	1100	1350	2600	3020
4	...	...	...	270	270	310	310	385	385	475	565	800	975	1200	1490	2800	3295
$4\frac{1}{8}$	...	...	...	...	...	...	...	465	465	580	680	900	1050	1350	1550	3050	3565
$4\frac{1}{4}$	...	...	...	...	...	...	...	600	600	700	800	1000	1250	1500	1700	3300	...
$4\frac{1}{2}$	...	...	...	...	...	...	...	750	750	850	950	1100	1500	1650	1900	3600	...
$4\frac{3}{4}$	...	...	...	...	...	...	...	900	900	1050	1150	1500	1750	1850	2250	3950	...
5	...	...	...	...	...	...	...	1100	1100	1250	1500	1800	1950	2200	2550	4275	...
$5\frac{1}{8}$	...	...	...	...	...	...	...	1350	1350	1500	1850	2000	2250	2500	2800	4600	...
$5\frac{1}{4}$	...	...	...	...	...	...	...	1650	1650	1800	2200	2500	2650	2800	3200	4950	...

Discount

SQUARE HEAD CAP SCREWS.

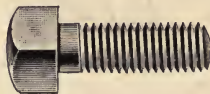


Fig. D. 698.

Adopted April 4, 1905.

Price Per 100.

Diameter of Head.	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{1}{2}$
Length of Head.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Diameter of Screw.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Length under head to extreme point.												
$\frac{1}{4}$	\$3 00	3 25	3 75	4 50	5 70							
$\frac{1}{2}$	3 15	3 40	3 90	4 70	5 80							
1	3 25	3 50	4 00	4 90	5 90	9 25	9 25					
$1\frac{1}{4}$	3 50	3 75	4 25	5 30	6 50	9 50	9 50	12 50				
$1\frac{1}{2}$	3 75	4 00	4 50	5 70	7 10	10 00	10 00	13 50	18 40			
$1\frac{3}{4}$	4 00	4 25	4 85	6 10	7 70	10 75	10 75	14 50	19 70	22 75		
2	4 25	4 85	5 20	6 50	8 30	11 50	11 50	15 50	21 00	25 00	34 00	38 50
$2\frac{1}{4}$	4 70	5 35	5 55	7 15	8 90	12 60	12 60	16 50	22 40	27 25	36 75	42 00
$2\frac{1}{2}$	5 25	5 80	6 00	7 50	9 50	13 60	13 60	17 50	23 70	29 50	39 50	45 50
$2\frac{3}{4}$	5 75	6 30	6 65	7 90	10 10	14 40	14 40	19 00	25 00	31 75	42 25	49 00
3	6 25	6 80	7 20	8 40	10 70	15 20	15 20	20 20	26 60	34 00	45 00	52 50
$3\frac{1}{4}$				9 15	11 50	16 00	16 00	22 10	28 20	36 36	47 56	56 00
$3\frac{1}{2}$				9 75	12 30	17 30	17 30	23 70	30 30	38 38	50 50	59 50
$3\frac{3}{4}$				10 50	13 10	18 60	18 60	25 30	33 31	40 40	53 53	63 00
4				11 10	13 90	19 90	19 90	26 90	33 60	43 43	56 56	66 50
$4\frac{1}{4}$								21 20	28 50	35 45	45 45	57 00
$4\frac{1}{2}$								22 50	30 30	37 37	47 37	57 50
$4\frac{3}{4}$								31 70	39 39	49 49	61 61	73 00
5								40 80	52 52	67 67	80 80	95 50
Threads to Inch.	20	18	16	14	12	12	11	10	9	8	7	7
Add for each $\frac{1}{4}$ In.	40	50	60	70	80	1 30	1 30	1 60	1 80	2 25	2 75	3 50

Discount.....

HEXAGON HEAD CAP SCREW.



Fig. D. 699.

Adopted April 4, 1905.

Price Per 100.

Diameter of Head.	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Length of Head.	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Diameter of Screw.	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Length under head to extreme point												
$\frac{1}{16}$	\$3 00	3 25	3 75	4 50	5 70							
1	3 15	3 40	3 90	4 70	5 80							
$1\frac{1}{8}$	3 25	3 50	4 00	4 90	5 90	9 25	9 25					
$1\frac{1}{4}$	3 50	3 75	4 25	5 30	6 50	9 50	9 50	12 50				
$1\frac{3}{8}$	3 75	4 00	4 50	5 70	7 10	10 00	10 00	13 50	18 40			
2	4 00	4 25	4 85	6 10	7 70	10 75	10 75	14 50	19 70	22 75		
$2\frac{1}{8}$	4 25	4 85	5 20	6 50	8 30	11 50	11 50	15 50	21 00	25 00	34 00	38 50
$2\frac{1}{4}$	4 70	5 35	5 55	7 15	8 90	12 60	12 60	16 50	22 40	27 25	36 75	42 00
$2\frac{3}{8}$	5 25	5 80	6 00	7 50	9 50	13 60	13 60	17 50	23 70	29 50	39 50	45 50
$2\frac{1}{2}$	5 75	6 30	6 65	8 90	10 14	14 40	14 40	19 00	25 00	31 75	42 25	49 00
3	6 25	6 80	7 20	9 40	10 70	15 20	15 20	20 20	26 40	34 00	45 00	52 50
$3\frac{1}{8}$				9 15	11 50	16 00	16 00	22 10	28 20	36 25	47 75	56 00
$3\frac{1}{4}$				9 75	12 30	17 30	17 30	23 70	30 38	40 50	50 50	59 50
$3\frac{3}{8}$				10 50	13 10	18 60	18 60	25 30	31 80	40 75	53 25	63 00
4				11 10	13 90	19 90	19 90	26 90	33 60	43 00	56 00	66 50
$4\frac{1}{8}$								21 20	28 50	35 40	45 25	58 75
$4\frac{1}{4}$								22 50	30 37	37 20	47 50	61 50
$4\frac{3}{8}$								31 70	39 00	49 75	64 25	77 00
5								40 80	52 00	67 00	80 00	95 50
Threads to Inch.	20	18	16	14	12 or 13	12	11	10	9	8	7	7
Add for each $\frac{1}{8}$ Inch.	40	50	60	70	80	1 30	1 30	1 60	1 80	2 25	2 75	3 50

Discount.....

SET SCREWS.



Fig. D. 700.

Case Hardened.

List of Iron Set Screws. Add 25 per cent for Steel.

Adopted April 4, 1905.

Price Per 100.

Diameter of Screw.	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Length Under Head to Extreme Point.												
$\frac{1}{8}$	1 80	2 00	2 35									
$\frac{1}{4}$	1 90	2 10	2 45	2 80	3 30							
$\frac{3}{8}$	2 00	2 20	2 50	2 90	3 40	5 00	5 00					
$\frac{1}{2}$	2 10	2 30	2 60	3 00	3 60	5 50	5 50					
$\frac{5}{8}$	2 15	2 35	2 65	3 10	3 80	5 75	5 75	10 00				
$1\frac{1}{8}$	2 30	2 50	2 85	3 50	4 30	6 50	6 50	11 00	15 50			
$1\frac{1}{4}$	2 50	2 70	3 10	4 00	4 80	7 25	7 25	12 00	16 20	20 22	00	
$1\frac{3}{8}$	2 75	3 00	3 50	4 50	5 40	8 00	8 00	12 80	17 70	24 00	41 70	
2	3 25	3 50	4 00	5 15	6 00	8 80	8 80	13 60	19 20	26 00	45 00	54 00
$2\frac{1}{4}$	3 75	4 00	4 50	5 75	6 75	9 60	9 60	14 50	20 20	28 00	48 30	58 30
$2\frac{1}{2}$	4 25	4 50	5 00	6 35	7 50	10 40	10 40	15 40	22 20	30 00	51 60	62 60
$2\frac{3}{4}$	4 75	5 00	5 50	6 75	8 25	11 20	11 20	16 30	23 70	32 00	54 90	66 90
3	5 25	5 50	6 00	7 20	9 00	12 00	12 00	17 30	25 20	34 00	58 20	71 20
$3\frac{1}{4}$				7 60	9 75	12 75	12 75	18 40	26 70	36 00	61 50	75 50
$3\frac{1}{2}$				8 00	10 50	13 50	13 50	19 50	28 20	38 00	64 80	79 80
$3\frac{3}{4}$				8 50	11 25	14 30	14 30	20 20	29 20	39 00	68 10	84 10
4				9 00	12 00	15 10	15 10	21 10	30 31	40 20	71 40	88 40
$4\frac{1}{4}$								15 90	23 50	32 70	44 70	92 70
$4\frac{1}{2}$								16 70	25 00	34 20	46 00	97 00
$4\frac{3}{4}$								26 50	35 70	48 00	81 30	101 30
5								37 20	50 00	64 60	84 60	105 60
Threads to Inch.	20	18	16	14	12	12	11	10	9	8	7	7
Add for each $\frac{1}{4}$ In.	50	60	70	80	90	1 10	1 10	1 50	1 70	2 25	3 30	4 30

Discount.....

HEADLESS SET SCREWS.

Fig. D. 700 $\frac{1}{2}$

Take same list as above, measurements being taken over all. Ordinary sizes only carried in stock.

Discount.....

SET SCREWS.

Allen's Patent Safety Steel Set Screws.

These hollow set screws are as efficient as screws with projecting heads, and being made of high test steel bars will stand more strain than projecting screws of same diameter.

It is not necessary that these hollow steel set screws be as long as the depth of hole, as a screw as long as its diameter is just as effective if it fits the hole; *this feature is very important*, as it eliminates the necessity of carrying a large stock of various lengths as is necessary when projecting screws are used. V-tapped holes may be re-tapped for U. S. Standard Screws. Don't try to force a U. S. Standard screw into a V-thread hole.

This screw has no equal when properly used, not only for its safety feature on revolving parts, but for *all* set screw purposes. It is much easier to wipe off and keep machinery clean where all screws are flush or below the surface.



Fig. D. 701.

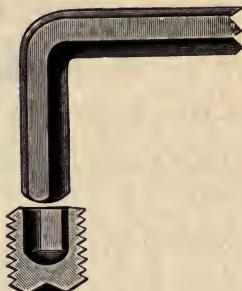


Fig. D. 702.

Diameter, Inches.	Length, Inches.	No. Threads to inch U. S. St'd.	Price, Per 100.	Extra Wrenches, Each.
1	1 1/4	8	\$20 00	\$0 12
1	1	8	20 00	12
7/8	1 1/8	9	15 00	09
7/8	7/8	9	15 00	09
3/4	1 1/2	10	18 00	06
3/4	1	10	12 00	06
3/4	7/8	10	18 00	06
3/4	3/4	10	12 00	06
5/8	1	11	15 00	05
5/8	3/4	11	10 00	05
5/8	5/8	11	10 00	05
5/8	1/2	12	8 00	05
1/2	1 1/4	13	14 00	04
1/2	1 1/8	13	10 50	04
1/2	1	13	10 50	04
1/2	3/4	13	10 50	04
1/2	5/8	13	7 00	04
1/2	1/2	13	7 00	04
1/2	1/2	14	6 00	04
1/2	1/2	14	6 00	04
3/8	1 1/2	16	5 00	02
3/8	3/8	16	5 00	02
5/16	3/8	18	4 00	02
5/16	1/8	18	4 00	0
1/4	1/8	20	4 00	0

Discount.....

In ordering please give length and whether U. S. Standard or V threads are wanted.

CARRIAGE BOLTS.



Fig. D. 703.

Adopted November 1, 1912.

Price Per 100.

Length in Inches.	$\frac{3}{16}$ and $\frac{1}{4}$ Inch.	$\frac{5}{16}$ Inch.	$\frac{3}{8}$ Inch.	$\frac{7}{16}$ Inch.	$\frac{1}{2}$ Inch.	$\frac{9}{16}$ and $\frac{5}{8}$ Inch.	$\frac{3}{4}$ Inch.
1½.....	\$1 00	\$1 40	\$1 90	\$2 20	.....	.....	.....
2.....	1 10	1 52	2 06	2 40	.....	.....	.....
2½.....	1 20	1 64	2 22	2 60	\$3 25	\$5 75	\$8 50
3.....	1 30	1 76	2 38	2 80	3 53	6 13	9 00
3½.....	1 40	1 88	2 54	3 00	3 81	6 51	9 50
4.....	1 50	2 00	2 70	3 20	4 09	6 89	10 00
4½.....	1 60	2 12	2 86	3 40	4 37	7 27	10 50
5.....	1 70	2 24	3 02	3 60	4 65	7 65	11 00
5½.....	1 80	2 36	3 18	3 80	4 93	8 03	11 50
6.....	1 90	2 48	3 34	4 00	5 21	8 41	12 00
6½.....	2 00	2 60	3 50	4 20	5 49	8 79	12 50
7.....	2 10	2 72	3 66	4 40	5 77	9 17	13 00
7½.....	2 20	2 84	3 82	4 60	6 05	9 55	13 50
8.....	2 30	2 96	3 98	4 80	6 33	9 93	14 00
8½.....	2 40	3 08	4 14	5 00	6 61	10 31	14 50
9.....	2 50	3 20	4 30	5 20	6 89	10 69	15 00
9½.....	2 60	3 32	4 46	5 40	7 17	11 07	15 50
10.....	2 70	3 44	4 62	5 60	7 45	11 45	16 00
11.....	2 90	3 68	4 94	6 00	8 01	12 21	17 00
12.....	3 10	3 92	5 26	6 40	8 57	12 97	18 00
13.....	3 30	4 16	5 58	6 80	9 13	13 73	19 00
14.....	3 50	4 40	5 90	7 20	9 69	14 49	20 00
15.....	3 70	4 64	6 22	7 60	10 25	15 25	21 00
16.....	3 90	4 88	6 54	8 00	10 81	16 01	22 00
17.....	4 10	5 12	6 86	8 40	11 37	16 77	23 00
18.....	4 30	5 36	7 18	8 80	11 93	17 53	24 00
19.....	4 50	5 60	7 50	9 20	12 49	18 29	25 00
20.....	4 70	5 84	7 82	9 60	13 05	19 05	26 00
Advance per inch....	0 20	0 24	0 32	0 40	0 56	0 76	1 00

Discount.....

Bolts with hexagon nuts, 15 per cent extra.
 Intermediate lengths take next higher list.
 Larger diameters take Machine Bolt list.

MACHINE BOLTS.



Fig. D. 704.

Adopted August 1, 1912.

Price Per 100.

Length in Ins.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$
$\frac{1}{4}$ to 1 $\frac{1}{2}$	\$1 70	\$2 00	\$2 40	\$2 80	\$3 60	\$5 20	\$7 70	\$10 50	\$15 10	\$22 50	\$30 00
2	1 78	2 12	2 56	3 00	3 86	5 58	8 25	11 20	16 00	23 70	31 50
2 $\frac{1}{2}$	1 86	2 24	2 72	3 20	4 12	5 96	8 80	11 90	16 90	24 90	33 00
3	1 94	2 36	2 88	3 40	4 38	6 34	9 35	12 60	17 80	26 10	34 50
3 $\frac{1}{2}$	2 02	2 48	3 04	3 60	4 64	6 72	9 90	13 30	18 70	27 30	36 00
4	2 10	2 60	3 20	3 80	4 90	7 10	10 45	14 00	19 60	28 50	37 50
4 $\frac{1}{2}$	2 18	2 72	3 36	4 00	5 16	7 48	11 00	14 70	20 50	29 70	39 00
5	2 26	2 84	3 52	4 20	5 42	7 86	11 55	15 40	21 40	30 90	40 50
5 $\frac{1}{2}$	2 34	2 96	3 68	4 40	5 68	8 24	12 10	16 10	22 30	32 10	42 00
6	2 42	3 08	3 84	4 60	5 94	8 62	12 65	16 80	23 20	33 30	43 50
6 $\frac{1}{2}$	2 50	3 20	4 00	4 80	6 20	9 00	13 20	17 50	24 10	34 50	45 00
7	2 58	3 32	4 16	5 00	6 46	9 38	13 75	18 20	25 00	35 70	46 50
7 $\frac{1}{2}$	2 66	3 44	4 32	5 20	6 72	9 76	14 30	18 90	25 90	36 90	48 00
8	2 74	3 56	4 48	5 40	6 98	10 14	14 85	19 60	26 80	38 10	49 50
9	2 90	3 80	4 80	5 80	7 50	10 90	15 95	21 00	28 60	40 50	52 50
10	3 06	4 04	5 12	6 20	8 02	11 66	17 05	22 40	30 40	42 90	55 50
11	3 22	4 28	5 44	6 60	8 54	12 42	18 15	23 80	32 20	45 30	58 50
12	3 38	4 52	5 76	7 00	9 06	13 18	19 25	25 20	34 00	47 70	61 50
13	.....	.....	6 08	7 40	9 58	13 94	20 35	26 60	35 80	50 10	64 50
14	.....	.....	6 40	7 80	10 10	14 70	21 45	28 00	37 60	52 50	67 50
15	.....	.....	6 72	8 20	10 62	15 46	22 55	29 40	39 40	54 90	70 50
16	.....	.....	7 04	8 60	11 14	16 22	23 65	30 80	41 20	57 30	73 50
17	.....	.....	.....	.....	11 66	16 98	24 75	32 20	43 00	59 70	76 50
18	.....	.....	.....	.....	12 18	17 74	25 85	33 60	44 80	62 10	79 50
19	.....	.....	.....	.....	12 70	18 50	26 95	35 00	46 60	64 50	82 50
20	.....	.....	.....	.....	13 22	19 26	28 05	36 40	48 40	66 90	85 50
21	.....	.....	.....	.....	.....	.....	29 15	37 80	50 20	69 30	88 50
22	.....	.....	.....	.....	.....	.....	30 25	39 20	52 00	71 70	91 50
23	.....	.....	.....	.....	.....	.....	31 35	40 60	53 80	74 10	94 50
24	.....	.....	.....	.....	.....	.....	32 45	42 00	55 60	76 50	97 50
25	.....	.....	.....	.....	.....	.....	33 55	43 40	57 40	78 90	100 50
26	.....	.....	.....	.....	.....	.....	34 65	44 80	59 20	81 30	103 50
27	.....	.....	.....	.....	.....	.....	35 75	46 20	61 00	83 70	106 50
28	.....	.....	.....	.....	.....	.....	36 85	47 60	62 80	86 10	109 50
29	.....	.....	.....	.....	.....	.....	37 95	49 00	64 60	88 50	112 50
30	.....	.....	.....	.....	.....	.....	39 05	50 40	66 40	90 90	115 50
Advance per inch,	16	24	32	40	52	76	1 10	1 40	1 80	2 40	3 00

Discount.

The following extras are to be understood as a part of this list:

Bolts with Hexagon Heads or Hexagon Nuts, 10 per cent. extra.

If both Hexagon Heads and Hexagon Nuts, 20 per cent. extra.

Joint Bolts with Oblong Nuts, Bolts with Tee Heads, Askew Heads and eccentric Heads, 10 per cent. extra.

Bolts with Cube Heads, 20 per cent. extra.

Bolts requiring extra upsets to form the head, 20 per cent. extra for each extra upset.

Special Bolts with irregular thread and unusual dimensions of heads or nuts will be charged extra at the discretion of the manufacturer.

Machine Bolts when fitted U. S. Std. Sq. Nuts, add 5%.

Machine Bolts fitted U. S. Std. Hex. Nuts, add 15%.

BLANK BOLTS.

Square or Round Heads. Finished Points.



Fig. D. 705.

Adopted August 1, 1913.

Price Per 100.

Length in Inches.	$\frac{1}{4}$ Inch.	$\frac{5}{16}$ Inch.	$\frac{3}{8}$ Inch.	$\frac{7}{16}$ Inch.	$\frac{1}{2}$ Inch.	$\frac{1}{8}$ and $\frac{5}{8}$ Inch.	$\frac{3}{4}$ Inch.	$\frac{7}{8}$ Inch.	1 Inch.	$1\frac{1}{8}$ Inches.	$1\frac{1}{4}$ Inches.
1½	\$1 20	\$1 40	\$1 60	\$2 00	\$2 50	\$4 00	\$6 10	\$7 80	\$10 40	\$16 00	\$21 60
2	1 30	1 52	1 74	2 18	2 74	4 36	6 65	8 50	11 30	17 20	23 10
2½	1 40	1 64	1 88	2 36	2 98	4 72	7 20	9 20	12 20	18 40	24 60
3	1 50	1 76	2 02	2 54	3 22	5 08	7 75	9 90	13 10	19 60	26 10
3½	1 60	1 88	2 16	2 72	3 46	5 44	8 30	10 60	14 00	20 80	27 60
4	1 70	2 00	2 30	2 90	3 70	5 80	8 85	11 30	14 90	22 00	29 10
4½	1 80	2 12	2 44	3 08	3 94	6 16	9 40	12 00	15 80	23 20	30 60
5	1 90	2 24	2 58	3 26	4 18	6 52	9 95	12 70	16 70	24 40	32 10
5½	2 00	2 36	2 72	3 44	4 42	6 88	10 50	13 40	17 60	25 60	33 60
6	2 10	2 48	2 86	3 62	4 66	7 24	11 05	14 10	18 50	26 80	35 10
6½	2 20	2 60	3 00	3 80	4 90	7 60	11 60	14 80	19 40	28 00	36 60
7	2 30	2 72	3 14	3 98	5 14	7 96	12 15	15 50	20 30	29 20	38 10
7½	2 40	2 84	3 28	4 16	5 38	8 32	12 70	16 20	21 20	30 40	39 60
8	2 50	2 96	3 42	4 34	5 62	8 68	13 25	16 90	22 10	31 60	41 10
9	2 70	3 20	3 70	4 70	6 10	9 40	14 35	18 30	23 90	34 00	44 10
10	2 90	3 44	3 98	5 06	6 58	10 12	15 45	19 70	25 70	36 40	47 10
11	3 10	3 68	4 26	5 42	7 06	10 84	16 55	21 10	27 50	38 80	50 10
12	3 30	3 92	4 54	5 78	7 54	11 56	17 65	22 50	29 30	41 20	53 10
13	.....	.....	4 82	6 14	8 02	12 28	18 75	23 90	31 10	43 60	56 10
14	.....	.....	5 10	6 50	8 50	13 00	19 85	25 30	32 90	46 00	59 10
15	.....	.....	5 38	6 86	8 98	13 72	20 95	26 70	34 70	48 40	62 10
16	.....	.....	5 66	7 22	9 46	14 44	22 05	28 10	36 50	50 80	65 10
17	.....	.....	.....	.....	9 94	15 16	23 15	29 50	38 30	53 20	68 10
18	.....	.....	.....	.....	10 42	15 88	24 25	30 90	40 10	55 60	71 10
19	.....	.....	.....	.....	10 90	16 60	25 35	32 30	41 90	58 00	74 10
20	.....	.....	.....	.....	11 38	17 32	26 45	33 70	43 70	60 40	77 10

Discount.....

The following extras are to be understood as a part of this list:

Blank Bolts with Hexagon Heads, Tee Heads, Askew Heads and Eccentric Heads, 10 per cent extra.

NET PRICES FOR EXTRA LENGTH OF THREADS AND EXTRA NUTS.

Manufacturers' Standard List.

In Effect November 15, 1899.

Size of Bolt.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	1
Extreme Length of Thread in inches...	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	3
For each additional $\frac{1}{8}$ inch of Thread per 100 Bolts.....	\$0 02	\$0 02	\$0 02 $\frac{1}{2}$	\$0 03	\$0 04	\$0 06	\$0 08	\$0 10	\$0 12
For one extra Square Nut per 100 Bolts. .	25	35	45	55	65	85	1 35	2 00	3 00
For one extra Hexagon Nut per 100 Bolts.....	35	45	55	70	85	1 15	1 75	2 50	3 60
Size of Nut.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{2}$			
For one Thumb or Wing Nut in place of Square or Hexagon Nuts per 100 Bolts.....	30	40	50	60	75	90			

BOLT ENDS.



Fig. D. 706.

Bolt Ends, with Square Nuts.

Price per Pound, Adopted September 20, 1899.

Size of Iron.	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2
Length...	6	7	7	8	9	10		12	13	14	15	16	17	18	19	20
Price per Lb.	20c.	18	16	14	12		10				11			12		

Hexagon Nuts, 10 per cent, extra.

Discount.....

Special lengths, or larger and smaller sizes, made to order.

DRIFT BOLTS.

Round or Square.

$\frac{1}{8}$ inch.....	per lb., \$.....	$\frac{1}{4}$ inch.....	per lb., \$.....
$\frac{1}{4}$ ".....	".....	$\frac{3}{8}$ ".....	".....
$\frac{3}{8}$ ".....	".....	$\frac{1}{2}$ ".....	".....

Made to order plain, pointed only, or with square heads, upset heads, large square beveled heads, or round heads as desired.

TIRE BOLTS.



Fig. D. 707.

Plain.



Fig. D. 708.

Fluted.

Price Per 100.

List of October 16, 1884.

List of December 28, 1899.

EAGLE, PHILADELPHIA and NORWAY

BAY STATE (COMMON)

Size.	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{3}{4}$	Size.	$\frac{1}{8}$ and $\frac{3}{16}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{3}{4}$
1 Inch	\$1 50	\$1 50	\$1 50				1 Inch	\$0 60	\$0 95	\$1 40	\$2 20
1 $\frac{1}{4}$ "	1 50	1 50	1 55	\$1 90			1 $\frac{1}{4}$ "	60	95	1 40	2 20
1 $\frac{1}{2}$ "	1 50	1 50	1 65	2 00	\$2 70		1 $\frac{1}{2}$ "	60	95	1 40	2 20
1 $\frac{3}{4}$ "	1 50	1 50	1 75	2 15	2 85		1 $\frac{3}{4}$ "	65	1 00	1 40	2 20
2 "	1 50	1 60	1 85	2 25	3 05	\$5 00	2 "	70	1 05	1 47	2 20
2 $\frac{1}{4}$ "	1 50	1 65	1 95	2 40	3 20	5 20	2 $\frac{1}{4}$ "	75	1 10	1 54	2 30
2 $\frac{1}{2}$ "	...	1 75	2 05	2 50	3 35	5 40	2 $\frac{1}{2}$ "	80	1 15	1 61	2 40
2 $\frac{3}{4}$ "	...	1 80	2 15	2 65	3 50	5 60	2 $\frac{3}{4}$ "	85	1 20	1 68	2 50
3 "	...	1 90	2 25	2 75	3 65	5 80	3 "	90	1 25	1 75	2 60
3 $\frac{1}{4}$ "	...	2 00	...	2 90	3 80	6 00	3 $\frac{1}{4}$ "	95	1 30	1 82	2 70
3 $\frac{1}{2}$ "	...	2 10	...	3 00	3 95	6 20	3 $\frac{1}{2}$ "	1 00	1 35	1 89	2 80
3 $\frac{3}{4}$ "	...	...	...	3 15	4 10	6 40	3 $\frac{3}{4}$ "	1 05	1 40	1 96	2 90
4 "	...	...	...	3 25	4 25	6 60	4 "	1 10	1 45	2 03	3 00
4 $\frac{1}{4}$ "	...	...	...	...	4 40	6 80	4 $\frac{1}{4}$ "	1 15	1 50	2 10	3 10
4 $\frac{1}{2}$ "	...	...	...	...	4 55	7 00	4 $\frac{1}{2}$ "	1 20	1 55	2 17	3 20
4 $\frac{3}{4}$ "	...	...	...	...	4 70	7 20	4 $\frac{3}{4}$ "	1 25	1 60	2 24	3 30
5 "	...	...	...	...	4 90	7 40	5 "	1 30	1 65	2 31	3 40
5 $\frac{1}{4}$ "	...	...	...	...	...	7 60	5 $\frac{1}{4}$ "	1 35	1 70	2 38	3 50
5 $\frac{1}{2}$ "	...	...	...	...	...	7 80	5 $\frac{1}{2}$ "	1 40	1 75	2 45	3 60
5 $\frac{3}{4}$ "	...	...	...	...	...	8 00	5 $\frac{3}{4}$ "	1 45	1 80	2 52	3 70
6 "	...	...	...	...	...	8 20	6 "	1 50	1 85	2 59	3 80

Discount.....

STOVE BOLTS.



Fig. D. 709.

Flat Head.



Fig. D. 710.

Round Head.

Flat and Round Head.

List adopted March 1, 1907.

Price Per 100.

Length, Inches.	Diameter $\frac{1}{2}$ and $\frac{5}{8}$ Inch.	$\frac{3}{8}$ Inch.	Diameter $\frac{7}{8}$ and 1 Inch.	$\frac{5}{8}$ Inch.	$\frac{3}{4}$ Inch.
$\frac{3}{4}$	\$0 85	\$0 85	.....	.....	.....
1	85	85	\$1 20	.....	.....
1 $\frac{1}{4}$	85	85	1 20	.....	.....
1 $\frac{1}{2}$	85	85	1 20	\$1 75	\$2 65
1 $\frac{3}{4}$	90	90	1 25	1 80	2 70
2	90	90	1 30	1 85	2 75
2 $\frac{1}{4}$	95	95	1 35	1 90	2 85
2 $\frac{1}{2}$	1 00	1 00	1 40	1 95	2 90
2 $\frac{3}{4}$	1 05	1 05	1 45	2 00	3 00
3	1 10	1 10	1 50	2 05	3 10
3 $\frac{1}{4}$	1 15	1 15	1 55	2 15	3 20
3 $\frac{1}{2}$	1 20	1 20	1 60	2 30	3 40
3 $\frac{3}{4}$	1 20	1 25	1 70	2 40	3 60
4	1 20	1 30	1 80	2 50	3 80
4 $\frac{1}{4}$	1 20	1 40	1 90	2 60	4 00
4 $\frac{1}{2}$	1 20	1 50	2 00	2 70	4 20
4 $\frac{3}{4}$	1 20	1 60	2 10	2 85	4 40
5	1 20	1 70	2 20	3 00	4 60
5 $\frac{1}{4}$	1 20	1 80	2 30	3 15	4 80
5 $\frac{1}{2}$	1 20	1 90	2 40	3 30	5 00
5 $\frac{3}{4}$	1 20	2 00	2 50	3 45	5 20
6	1 20	2 10	2 60	3 60	5 40
6 $\frac{1}{4}$	1 20	2 20	2 70	3 75	5 60
6 $\frac{1}{2}$	1 20	2 30	2 85	3 90	5 80
6 $\frac{3}{4}$	1 20	2 40	3 00	4 10	6 00
7	1 20	2 50	3 15	4 30	6 20
7 $\frac{1}{4}$	1 20	2 60	3 30	4 50	6 40
7 $\frac{1}{2}$	1 20	2 75	3 45	4 70	6 60
7 $\frac{3}{4}$	1 20	2 90	3 60	4 90	6 80
8	1 20	3 05	3 75	5 10	7 00

Discount

BOILER PATCH BOLTS.

Fig. D. 711.
Finished.Fig. D. 712.
Blank.

Price Per 100, Finished and Threaded.

Diameter		$\frac{1}{2}$ In.	$\frac{3}{4}$ In.	$\frac{1}{2}$ In.	$\frac{7}{8}$ In.	1 In.
Length from largest Diameter of Bevel to Point.	$\frac{1}{2}$ In.	\$3 75	\$4 25	\$6 00	\$ 9 50	\$13 50
	$\frac{3}{4}$ "	4 00	4 50	6 00	9 50	13 50
	1 "	4 25	4 80	6 50	9 50	13 50
	$1\frac{1}{8}$ "	4 50	5 10	6 80	9 85	14 00
	$1\frac{1}{4}$ "	4 75	5 50	7 25	10 25	14 75
	$1\frac{1}{2}$ "	5 25	6 50	8 25	11 25	16 25
Threads to Inch..		14	12	12	12	12

Discount.....

Blanks.

Diameter	$\frac{1}{2}$ In.	$\frac{3}{4}$ In.	$\frac{1}{2}$ In.	$\frac{7}{8}$ In.	1 In.
Price per lb. in Lots of 25 lbs. or over.....	\$0 25	\$0 20	\$0 19	\$0 18	\$0 17

Discount.....

PLOW BOLTS.



No. 1.
Key Head.



No. 2.
Round Head.



No. 3.
Round Head Square
Shank.



No. 4.
Square Head.

With Right or Left Hand Threads, as may be ordered.

Price per 100.

Length.	$\frac{1}{8}$ Inch.	$\frac{3}{8}$ Inch.	$\frac{1}{2}$ Inch.	$\frac{3}{4}$ Inch.	$\frac{1}{2}$ Inch.	$\frac{3}{8}$ Inch.
$1\frac{1}{4}$	\$1 70	\$2 00	\$2 60	\$3 50	\$4 50	\$5 70
$1\frac{1}{2}$	1 80	2 10	2 75	3 70	4 75	6 00
$1\frac{3}{4}$	1 90	2 20	2 90	3 90	5 00	6 30
2.....	2 00	2 30	3 05	4 10	5 25	6 60
$2\frac{1}{4}$	2 10	2 40	3 20	4 30	5 50	6 90
$2\frac{1}{2}$	2 20	2 50	3 35	4 50	5 75	7 20
$2\frac{3}{4}$	2 30	2 60	3 50	4 70	6 00	7 50
3.....	2 40	2 70	3 65	4 90	6 25	7 80
$3\frac{1}{4}$	2 50	2 80	3 80	5 10	6 50	8 10
$3\frac{1}{2}$	2 60	2 90	3 95	5 30	6 75	8 40
$3\frac{3}{4}$	2 70	3 00	4 10	5 50	7 00	8 70
4.....	2 80	3 10	4 25	5 70	7 25	9 00

In ordering, please state what style head is wanted. Right hand threads will be furnished unless left hand threads are ordered.

Discount.....

ELEVATOR BOLTS.



No. 1.
Counter Sunk Head.



No. 2.
Oval Head.
Price per 100.



No. 3.
Key Head.

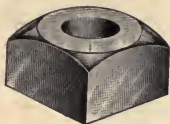
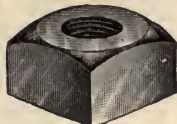
Large Countersunk Heads. Wrought Iron.								Oval Heads. $\frac{3}{8}$ and $\frac{1}{4}$ -inch. Wrought Iron.		Key Heads. $\frac{3}{8}$ and $\frac{1}{4}$ -inch. Wrought Iron.	
Length	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2				
Diam.								$\frac{3}{4}$ -inch, \$1 50		$\frac{3}{4}$ -inch, \$1 50	
$\frac{1}{8}$	\$2 20	\$2 30	\$2 30	\$2 40	\$2 50	\$2 60	\$2 70	$\frac{7}{8}$ " 1 60		$\frac{7}{8}$ " 1 60	
$\frac{1}{4}$	2 20	2 30	2 30	2 40	2 50	2 60	2 70	1 " 1 60		1 " 1 60	
$\frac{3}{8}$			3 00	3 20	3 40	3 60	3 80	$1\frac{1}{8}$ " 1 70		$1\frac{1}{4}$ " 1 80	
$\frac{1}{2}$			4 00	4 30	4 60	4 90	5 20	$1\frac{1}{4}$ " 1 80			

Discount.....

HOT-PRESSED SQUARE NUTS.

United States
Standard.Association Standard List,
taking effect February 1, 1899.

Revised January 1, 1906.

Fig. D. 715.
Blank.Fig. D. 716.
Tapped.

Width.	Thick.	Hole.	Bolt.	Price per lb. in 200-lb. Kegs.		Average Number in 1 Keg.	
				Blank.	Tapped.	Blank.	Tapped.
Inches.	Inches.	Inches.	Inches.	Cents.	Cents.		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{8}$	13	15	13800	14760
$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	12	13.5	7400	7915
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	10.5	11.6	5000	5320
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	10	10.9	3200	3400
$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	9	9.7	2400	2540
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	9	9.6	1600	1690
$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	8.7	9.2	1360	1440
$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	8.5	8.9	832	880
$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	8.4	8.8	544	578
$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	8.4	8.8	376	397
$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{4}$	8.4	8.8	268	284
2	2	2	2	8.4	8.8	206	220
$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	8.5	9	146	157
$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	8.8	9.4	120	127
$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	9	9.7	95	100
$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	9.3	10	74	77
$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	9.5	10.3	64	67
3	3	3	3	9.7	10.6	53	56
$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	10	11	43	45
$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	10	11.1	36	37
$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	10.3	11.5	28	29
$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	10.5	11.8	24	25
$3\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{3}{4}$	11	12.4	21	22
4	4	4	4	11.5	13	16	17

For less than keg lots (200 lbs.) of a size, add—

20 cents per cwt. for 100 lbs. or over.

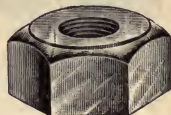
50 " " " " less than 100 lbs.

Discount.....

HOT PRESSED HEXAGON NUTS.

Fig. D. 717.
Blank.United States
Standard.Association Standard List, taking
effect February 1, 1899.

Revised January 1, 1906.

Fig. D. 718.
Tapped.

Width.	Thick.	Hole.	Bolt.	Prices per lb. in 200-lb. Kegs.		Average Number in 1 Keg.	
				Blank.	Tapped.	Blank.	Tapped.
Inches.	Inches.	Inches.	Inches.	Cents.	Cents.		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{8}$	20	22.5	17400	18600
$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	18	20	9200	9760
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{13}{64}$	$\frac{1}{4}$	14	15.6	6000	6400
$\frac{1}{2}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{3}{8}$	13	14.3	4000	4250
$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{32}$	$\frac{1}{2}$	11.2	12.2	3000	3200
$\frac{3}{4}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	11.2	12.1	2128	2275
1	$\frac{5}{8}$	$\frac{13}{16}$	1	10.5	11.2	1540	1630
$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{8}$	10	10.6	998	1050
$1\frac{1}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$1\frac{1}{4}$	9.9	10.5	628	665
$1\frac{3}{8}$	1	$\frac{1}{2}$	1	9.9	10.5	436	460
$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{1}{2}$	$1\frac{1}{2}$	9.9	10.5	288	305
2	$1\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{2}$	9.9	10.5	250	260
$2\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$	10	10.7	182	190
$2\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{4}$	10.3	11.1	144	150
$2\frac{3}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	10.5	11.4	116	120
$2\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	10.8	11.7	95	100
$2\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	11	12	80	84
3	2	$1\frac{3}{4}$	2	11.2	12.3	62	65
$3\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{3}{4}$	$2\frac{1}{8}$	11.7	12.9	52	54
$3\frac{1}{4}$	$2\frac{1}{4}$	$1\frac{3}{4}$	$2\frac{1}{4}$	11.7	13	44	46
$3\frac{3}{8}$	$2\frac{3}{8}$	2	$2\frac{3}{8}$	12.2	13.6	35	36
$3\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{4}$	12.4	13.9	32	33
$4\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	13	14.6	27	27
$4\frac{3}{4}$	3	$2\frac{5}{8}$	3	13.5	15.2	18	18

For less than keg lots (200 lbs.) of a size, add—

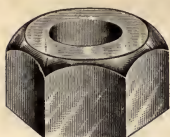
20 cents per cwt. for 100 lbs. or over.

50 " " " " less than 100 lbs.

Discount.....

HOT PRESSED HEXAGON NUTS.

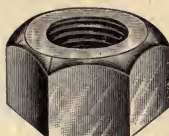
Enlarged Holes.

Fig. D. 721.
Blank.

U. S. Standard Sizes.

Association Standard List, taking
effect February 1, 1899.

Revised January 1, 1906.

Fig. D. 722.
Tapped.

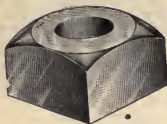
Short Diameter.	Thick.	Hole.	Bolt.	Price per cwt. in 200-lb. Kegs.	
				Blank.	Tapped.
Inches.	Inches.	Inches.	Inches.		
$\frac{1}{8}$	$\frac{1}{4}$	$\frac{7}{32}$	$\frac{1}{4}$	\$20 00	\$22 50
$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	18 15	20 15
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{11}{16}$	$\frac{3}{8}$	14 00	15 60
$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	13 00	14 30
$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	11 20	12 20
$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	11 35	12 25
$1 \frac{1}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	10 65	11 35
$1 \frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	10 10	10 70
$1 \frac{3}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	10 05	10 65
$1 \frac{5}{8}$	1	$\frac{7}{8}$	1	9 90	10 50
$1 \frac{3}{4}$	$1 \frac{1}{8}$	$1 \frac{1}{8}$	$1 \frac{1}{8}$	10 05	10 65
2	$1 \frac{1}{4}$	$1 \frac{1}{4}$	$1 \frac{1}{4}$	10 05	10 65
$2 \frac{1}{8}$	$1 \frac{3}{8}$	$1 \frac{1}{8}$	$1 \frac{3}{8}$	10 15	10 85
$2 \frac{1}{4}$	$1 \frac{1}{2}$	$1 \frac{1}{4}$	$1 \frac{1}{4}$	10 45	11 25
$2 \frac{3}{8}$	$1 \frac{5}{8}$	$1 \frac{1}{8}$	$1 \frac{5}{8}$	10 65	11 55
$2 \frac{1}{2}$	$1 \frac{3}{4}$	$1 \frac{1}{2}$	$1 \frac{3}{4}$	10 95	11 85
$2 \frac{5}{8}$	$1 \frac{7}{8}$	$1 \frac{3}{4}$	$1 \frac{7}{8}$	11 15	12 15
$3 \frac{1}{8}$	2	$1 \frac{3}{4}$	2	11 35	12 45
$3 \frac{1}{4}$	$2 \frac{1}{8}$	$1 \frac{3}{4}$	$2 \frac{1}{8}$	11 85	13 05
$3 \frac{3}{8}$	$2 \frac{1}{4}$	2	$2 \frac{1}{4}$	11 85	13 15
$3 \frac{1}{2}$	$2 \frac{3}{8}$	$2 \frac{1}{8}$	$2 \frac{3}{8}$	12 35	13 75
$3 \frac{5}{8}$	$2 \frac{1}{2}$	$2 \frac{1}{4}$	$2 \frac{5}{8}$	12 55	14 05
$4 \frac{1}{8}$	$2 \frac{3}{4}$	$2 \frac{3}{8}$	$2 \frac{3}{4}$	13 15	14 75
$4 \frac{1}{4}$	3	$2 \frac{3}{4}$	3	13 65	15 35

For less than keg lots (200 pounds) of a size add—20 cents per cwt. for 100 pounds or over.

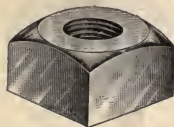
For less than keg lots (200 pounds) of a size add—50 cents per cwt. for less than 100 pounds.

Discount

HOT PRESSED SQUARE NUTS.

Fig. D. 723.
Blank.Manufacturers'
StandardAssociation Standard List, taking
effect February 1 1899.

Revised January 1, 1906.

Fig. D. 724.
Tapped.

Width.	Thick.	Hole.	Bolt.	Price per lb. in 200-lb. Kegs.		Average No. in 1 Keg.	
				Blank.	Tapped	Blank.	Tapped.
Inches.	Inches.	Inches.	Inches.	Cents.	Cents.		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{8}$	13	15	15000	15800
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{5}{16}$	11.5	13	7000	7400
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{8}$	10	11.1	4200	4400
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	9.2	10.1	3000	3200
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.7	9.4	1800	1890
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	8.6	9.2	1200	1250
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.5	9	966	1000
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	8.4	8.8	544	580
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.3	8.7	326	340
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	8.3	8.7	240	250
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.3	8.7	203	210
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	8.3	8.7	112	120
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.5	9	84	87
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	8.7	9.3	66	70
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	8.9	9.6	52	55
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	9.2	9.9	40	42
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	9.4	10.2	35	38
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	9.6	10.5	29	30
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	9.7	10.7	27	29
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	9.9	11	21	22
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	10.1	11.3	20	20
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	10.3	11.6	19	19
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	10.80	12.20		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	11.30	12.80		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{3}{4}$	12.00	13.60		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{2}$	13.00	14.70		

For less than keg lots (200 lbs.) of a size, add—

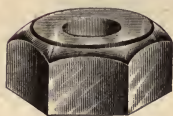
20 cents per cwt. for 100 lbs. or over.

50 " " " " less than 100 lbs.

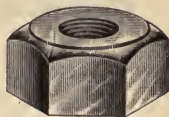
See list U. S. Standards, with enlarged holes, page 346, now being generally
used in place of above sizes.

Discount

HOT PRESSED HEXAGON NUTS.

Fig. D. 725.
Blank.Manufacturers'
Standard.Association Standard List, taking
effect February 1, 1899.

Revised January 1, 1906.

Fig. D. 726.
Tapped.

Short Diameter	Thick.	Hole.	Bolt.	Price per lb. in 200-lb. Kegs.		Average Number in 1 Keg.	
				Blank.	Tapped.	Blank.	Tapped.
Inches.	Inches.	Inches.	Inches.	Cents.	Cents.		
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{1}{8}$	20	22.5	17800	18700
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{4}$	16	18	8600	9030
$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{16}$	$\frac{3}{8}$	13	14.6	5000	5200
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	11.4	12.7	3200	3350
$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{16}$	$\frac{5}{8}$	10.5	11.5	2000	2100
1	1	$\frac{3}{4}$	1	10.4	11.3	1568	1650
$1\frac{1}{8}$	$1\frac{1}{8}$	$\frac{7}{8}$	$1\frac{1}{8}$	10.1	10.8	1118	1175
$1\frac{1}{4}$	$1\frac{1}{4}$	1	$1\frac{1}{4}$	9.9	10.5	800	842
$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	9.8	10.4	464	487
$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{2}$	9.8	10.4	360	377
$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{3}{8}$	$1\frac{3}{4}$	9.8	10.4	216	225
2	2	$1\frac{1}{2}$	2	9.8	10.4	158	167
$2\frac{1}{8}$	$2\frac{1}{8}$	$1\frac{7}{8}$	$2\frac{1}{8}$	10	10.7	115	122
$2\frac{1}{4}$	$2\frac{1}{4}$	2	$2\frac{1}{4}$	10.2	11	90	95
$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	10.4	11.3	72	75
3	3	$2\frac{1}{2}$	3	10.7	11.6	55	58
$3\frac{1}{8}$	$3\frac{1}{8}$	$2\frac{3}{4}$	$3\frac{1}{8}$	10.9	11.9	45	47
$3\frac{1}{4}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{1}{4}$	11.1	12.2	47	49
$3\frac{3}{8}$	$3\frac{3}{8}$	3	$3\frac{3}{8}$	11.4	12.6		
$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{1}{2}$	11.6	12.9		
$3\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{1}{2}$	$3\frac{3}{4}$	12	13.4		
4	4	$3\frac{3}{8}$	4	12.3	13.8		
$4\frac{1}{8}$	$4\frac{1}{8}$	$3\frac{7}{8}$	$4\frac{1}{8}$	13	14.6		
$4\frac{1}{4}$	$4\frac{1}{4}$	4	$4\frac{1}{4}$	13.5	15.2		
$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{1}{4}$	$4\frac{3}{8}$	14.5	16.3		
5	5	$4\frac{3}{4}$	5	15.5	17.4		
$5\frac{1}{8}$	$5\frac{1}{8}$	5	$5\frac{1}{8}$				

For less than keg lots (200 lbs.) of a size, add—
 20 cents per cwt. for 100 lbs. or over.
 50 " " " " less than 100 lbs.

See List U. S. Standards, with enlarged holes, page 347, now being used in place of above sizes.

Discount.

STANDARD WROUGHT WASHERS.



Fig. D. 727.

Adopted January 20, 1910.

U. S. Standard Sizes.

In 200-Pound Kegs.

Diameter.	Size of Hole.	Thickness Wire Gauge.	Size of Bolt.	Price Per Pound.	Number in 100 Pounds.
$\frac{1}{8}$	$\frac{1}{8}$	No. 18	$\frac{1}{8}$	\$14 00	39,400
$\frac{1}{4}$	$\frac{1}{4}$	No. 16	$\frac{1}{4}$	12 20	15,600
$\frac{3}{8}$	$\frac{3}{8}$	No. 16	$\frac{3}{8}$	11 40	11,250
1	$\frac{1}{2}$	No. 14	$\frac{1}{2}$	10 50	6,800
$1\frac{1}{4}$	$\frac{3}{4}$	No. 14	$\frac{3}{4}$	9 80	4,300
$1\frac{1}{2}$	$\frac{7}{8}$	No. 12	$\frac{7}{8}$	9 40	2,600
$1\frac{3}{4}$	1	No. 12	1	9 30	2,250
2	$1\frac{1}{8}$	No. 10	$1\frac{1}{8}$	9 20	1,300
$2\frac{1}{4}$	$1\frac{1}{4}$	No. 9	$1\frac{1}{4}$	9 10	900
$2\frac{1}{2}$	$1\frac{3}{8}$	No. 8	$1\frac{3}{8}$	9 00	782
$2\frac{3}{4}$	$1\frac{1}{2}$	No. 8	1	9 00	568
3	$1\frac{3}{4}$	No. 8	$1\frac{1}{2}$	9 00	473
$3\frac{1}{4}$	2	No. 8	$1\frac{3}{4}$	9 20	364
$3\frac{1}{2}$	$2\frac{1}{8}$	No. 7	1	9 20	275
$3\frac{3}{4}$	$2\frac{1}{4}$	No. 7	$1\frac{1}{2}$	9 20	256
4	$2\frac{3}{8}$	No. 7	$1\frac{3}{4}$	9 50	220
$4\frac{1}{4}$	$2\frac{1}{2}$	No. 7	1	9 50	197
$4\frac{1}{2}$	2	No. 7	$1\frac{1}{2}$	9 50	174
$4\frac{3}{4}$	$2\frac{1}{4}$	No. 7	2	9 50	160
5	$2\frac{3}{8}$	No. 5	$2\frac{1}{4}$	10 50	122
	$2\frac{1}{2}$	No. 4	$2\frac{3}{4}$	10 50	106

Discount.....

For less than keg lots (200 pounds) of a size.

Add \$.10 cwt. for 100 pound kegs.

Add .20 cwt. for 51 to 100 pound boxes.

Add .30 cwt. for 25 to 50 pound boxes.

Add .50 cwt. for 5 pound boxes.

Add 1.00 cwt. for 1 pound boxes.

Washers of irregular sizes made to order will be charged extra at our discretion.

Cast Iron Washers of Any Pattern Furnished.

TURN BUCKLES.

Open.



Fig. D. 728.

With right and left hand threads, fitted with stub ends.

Prices, Complete.

Size.	Price, Each.	Size.	Price, Each.	Size.	Price, Each.
$\frac{1}{8}$ inch.	\$0 38	$1\frac{1}{8}$ inch.	\$1 00	$2\frac{1}{8}$ inch.	\$3 50
$\frac{1}{4}$ "	40	$1\frac{1}{4}$ "	1 25	$2\frac{1}{4}$ "	4 00
$\frac{3}{8}$ "	42	$1\frac{3}{8}$ "	1 38	$2\frac{3}{8}$ "	4 50
$\frac{1}{2}$ "	45	$1\frac{1}{2}$ "	1 50	$2\frac{1}{2}$ "	5 00
$\frac{5}{8}$ "	48	$1\frac{5}{8}$ "	1 75	$2\frac{5}{8}$ "	5 50
$\frac{3}{4}$ "	50	$1\frac{3}{4}$ "	2 00	$2\frac{3}{4}$ "	6 00
$\frac{7}{8}$ "	63	$1\frac{7}{8}$ "	2 25	3 "	6 50
1 "	75	2 "	2 65	$3\frac{1}{8}$ "	8 00
	88	$2\frac{1}{8}$ "	3 10	$3\frac{1}{4}$ "	10 00

Buckles without bolt ends, tapped U. S. Standard, at a liberal discount from above list.

Above prices are for first or standard length buckles, viz.: $5\frac{1}{2}$ inches clear, between heads.

Second length, 9 inches clear, between heads, add 25 per cent to list.

Third " 12 " " " 50 " " "

Fourth " 15 " " " 100 " " "

Fifth " 18 " " " 150 " " "

Sixth " 24 " " " $3\frac{1}{2}$ times list.

Discount.....

HEXAGON SLEEVE NUTS.

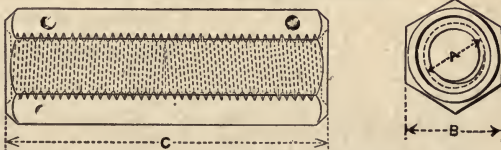


Fig. D. 729.

A	B	C	A	B	C	A	B	C
$\frac{1}{8}$	$\frac{1}{4}$	6	$1\frac{1}{8}$	$1\frac{1}{4}$	$7\frac{1}{2}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$10\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{2}$	6	$1\frac{1}{4}$	$1\frac{1}{2}$	8	2	$3\frac{1}{8}$	11
$\frac{3}{8}$	$\frac{3}{4}$	$6\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{3}{4}$	$8\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{1}{4}$	$11\frac{1}{2}$
$\frac{1}{2}$	1	7	$1\frac{1}{2}$	2	9	$2\frac{3}{8}$	$3\frac{3}{4}$	12
$\frac{5}{8}$	$1\frac{1}{4}$	$7\frac{1}{2}$	$1\frac{5}{8}$	$2\frac{1}{4}$	$9\frac{1}{2}$	$2\frac{1}{2}$	$4\frac{1}{8}$	$12\frac{1}{2}$
$\frac{3}{4}$	$1\frac{1}{2}$	$7\frac{3}{4}$	$1\frac{3}{4}$	$2\frac{3}{4}$	10	3	$4\frac{1}{4}$	$12\frac{3}{4}$

Dimensions given in tables under letter "C" are standard lengths, but any length can be furnished from 6 inches to 24 inches, inclusive.

Prices upon application.

SPRING COTTERS.



Fig. D. 730.*

List January 1st, 1906

Price Per Thousand.

Wire Gauge.	13	12	11	10	9	8	7	6	5	4	1
Diam.	$\frac{3}{32}$	$\frac{7}{64}$	$\frac{1}{8}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{13}{64}$	$\frac{7}{32}$	$\frac{1}{2}$	$\frac{5}{16}$
Length.											
$\frac{1}{2}$	\$3 50	\$4 00	\$5 00	\$6 00	\$7 00	\$8 00	.....	.....	.....	.....	.....
$\frac{3}{4}$	4 15	4 75	5 85	7 00	8 15	9 30	\$11 10	\$12 00	.....	.....	.....
1	4 80	5 50	6 70	8 00	9 30	10 60	12 80	14 00	\$18 00	\$20 00	\$32 50
$1\frac{1}{4}$	5 45	6 25	7 55	9 00	10 45	11 90	14 50	16 00	20 80	23 50	37 50
$1\frac{1}{2}$	6 10	7 00	8 40	10 00	11 60	13 20	16 20	18 00	23 60	27 00	42 50
$1\frac{3}{4}$	6 75	7 75	9 25	11 00	12 75	14 50	17 90	20 00	26 40	30 50	47 50
2	7 40	8 50	10 10	12 00	13 90	15 80	19 60	22 00	29 20	34 00	52 50
$2\frac{1}{4}$	.....	.....	10 95	13 00	15 05	17 10	21 30	24 00	32 00	37 50	57 50
$2\frac{1}{2}$	.....	.....	11 80	14 00	16 20	18 40	23 00	26 00	34 80	41 00	62 50
$2\frac{3}{4}$	.....	.....	.....	.....	.....	.....	24 70	28 00	37 60	44 50	67 50
3	.....	.....	.....	.....	.....	.....	26 40	30 00	40 40	48 00	72 50
$3\frac{1}{4}$	.....	.....	.....	.....	.....	.....	.....	.....	.....	51 50	77 50
$3\frac{1}{2}$	.....	.....	.....	.....	.....	.....	.....	.....	.....	55 00	82 50
$3\frac{3}{4}$	.....	.....	.....	.....	.....	.....	.....	.....	.....	58 50	87 50
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	62 00	92 50
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	76 00	112 50
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	90 00	132 50

*Discount.

BRASS SPRING COTTERS.—List eight times the above.

All sizes to order promptly. Write for discount.

SPRING COTTERS.



Fig. D. 731.

List January 1, 1906.

Price Per Thousand.

Diameter	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$
Length.				
1 $\frac{1}{2}$	\$ 72 00			
1 $\frac{3}{4}$	79 20	\$108 00		
2	86 40	119 50	\$148 50	
2 $\frac{1}{4}$	93 60	131 00	163 50	
2 $\frac{1}{2}$	100 80	142 50	178 50	
2 $\frac{3}{4}$	108 00	154 00	193 50	
3	115 20	165 50	208 50	\$384 00
3 $\frac{1}{4}$	122 40	177 00	223 50	404 00
3 $\frac{1}{2}$	129 60	188 50	238 50	424 00
3 $\frac{3}{4}$	136 80	200 00	253 50	444 00
4	144 00	211 50	268 50	464 00
5		257 50	328 50	544 00
6			388 50	644 00

Discount

CELLAR BOX COTTERS.

List January 1, 1906.

Price Per Thousand.

Diameter	$\frac{1}{4}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$
Length.						
3						\$ 900 00
4						1068 00
5						1236 00
6						1404 00
7	\$412 00	\$ 628 00	\$ 796 00	\$ 852 00	\$ 960 00	1572 00
8	454 00	689 00	877 00	948 00	1080 00	1740 00
9	496 00	750 00	958 00	1044 00	1200 00	1908 00
10	538 00	811 00	1039 00	1140 00	1320 00	2076 00
11	580 00	872 00	1120 00	1236 00	1440 00	2244 00
12	622 00	933 00	1201 00	1332 00	1560 00	2412 00
13	664 00	994 00	1282 00	1428 00	1680 00	2580 00
14	706 00	1055 00	1363 00	1524 00	1800 00	2748 00
15	748 00	1116 00	1444 00	1620 00	1920 00	2916 00
16	790 00	1177 00	1525 00	1716 00	2040 00	3084 00
17	832 00	1238 00	1606 00	1812 00	2160 00	3252 00
18	876 00	1299 00	1687 00	1908 00	2280 00	3420 00

Discount

FLAT SPRING KEYS.



Fig. D. 732.

Price List January 1st, 1906.

Price Per Thousand.

WIDTH, INCHES.		$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{3}{4}$
Length, inches.....					
1 $\frac{1}{4}$	\$39 00	\$52 00	.....	.....	.....
1 $\frac{3}{4}$	44 50	58 00	.....	.....	.....
1 $\frac{1}{2}$	50 00	64 00	\$ 78 00	.....	.....
2.....	55 50	70 00	84 50	\$104 00	\$125 00
2 $\frac{1}{4}$	61 00	76 00	91 00	111 00	131 00
2 $\frac{1}{2}$	66 50	82 00	97 50	118 00	138 00
2 $\frac{3}{4}$	72 00	88 00	104 00	125 00	147 00
3.....	77 50	94 00	110 50	132 00	155 00
3 $\frac{1}{4}$.....	.....	.....	117 00	139 00	162 00
3 $\frac{1}{2}$.....	.....	.....	123 50	146 00	170 00

Discount.....

RIVETED FLAT KEYS.

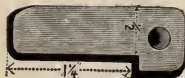


Fig. D. 733.



Fig. D. 734.

Special prices quoted upon application. Always give measurements as illustrated above and *thickness* of metal required.

METALS.

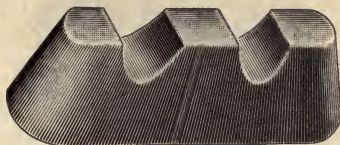


Fig. D. 735.

Having our own private wires, we are in direct telegraphic communication with the metal market and are in position to quote lowest market prices promptly. Inquiries solicited.

"Lake" Ingot Copper.

"Casting" Ingot Copper.

Pig Tin.

"Hungarian" Antimony.

"Cookson's" Antimony.

Antimonial Lead.

Phosphor Copper.

Phosphor Tin.

Aluminum.

Bismuth.

Nickel.

Spelter or Slab Zinc.

Pig Lead.

SHEET ZINC.

Regular 36"x84", No. 9 (14 pounds per sheet), always in stock. Other sizes and weights to order.

BRAZING SPELTER OR SOLDER.

Coarse, long grain.....	per lb.
Medium, long grain.....	per lb.
Fine, round grain.	per lb.

Tinners' Solder.

ANTI-FRICTION METAL.

Monarch Ball Metal.



Fig. D. 736.

Compound fluxes are very beneficial to a metal or alloy if mixed with it at the time it is melted to be poured into the boxes. The "Monarch Ball" is a metal so prepared that the flux and alloy are melted together for the first time as the consumer uses it. It comes in spherical form in the center of which is a compound flux. The flux and alloy being melted together for the first time when used by the consumer, produces the following beneficial results: It flows as freely as water, leaving the bearing surface as smooth as glass; produces tough elastic metal which will not shrink away from the boxes or shaft.

Price per lb.....

BABBITT METAL.

"Magnolia".....	per lb., \$.....
Copper, Genuine.....	".....
Hard.....	".....
XX.....	".....
X.....	".....
A 1.....	".....
No. 1.....	".....

Prices based upon market price of metals. We will be pleased to quote upon application.

LADLES.
Drop Forged.



Fig. D. 737.

Size....inches	2½	3	3½	4	5	6	7	8	9	10
Price, per doz.	\$3 75	4 65	5 50	6 50	8 75	10 00	22 00	28 00	45 00	54 00

These ladles are of extra heavy mild steel.
Other styles and sizes on application.

Discount.....

PLUMBAGO OR GRAPHITE CRUCIBLES.



Fig. D. 738.

Price, Crucibles.		Price, Crucible Covers.	
Nos. 0, 00, 000, 0000.....doz.,	\$2 70	Nos. 0, 00, 000, 0000.....doz.,	\$2 25
No. 1.....each,	38	Nos. 1, 2, 3, 4, 5.....each,	23
No. 2....."	45	Nos. 6, 7, 8....."	30
No. 3....."	53	Nos. 9, 10....."	30
No. 4....."	60	Nos. 12, 14, 16....."	38
No. 5....."	68	Nos. 18, 20....."	38
No. 6....."	75	Nos. 25 to 300.....per No.	01½
No. 7....."	83		
No. 8....."	90		
No. 9....."	98		
No. 10....."	1 05		
No. 12 and over.....per No.			

No.	Holding Capacity Liquid Measure.			Height Outside.	Diam. at the Top Outside.	Diam. at the Bilge Outside.	Diam. at the Bottom Outside.	No.	Holding Capacity Liquid Measure.			Height Outside.	Diam. at the Top Outside.	Diam. at the Bilge Outside.	Diam. at the Bottom Outside.
	Gal.	Qt.	Pt.						Gal.	Qt.	Pt.				
1	1½	3½	3½	3	2½	35	1	2	1	11½	9½	9½	7
2	1	4½	3½	3½	2½	40	2	....	....	12½	9½	10½	7½
3	1	5½	4½	4½	3	45	2	1	....	13	9½	10½	7½
4	1½	5½	4½	4½	3½	50	2	3	....	13½	10½	11½	8
5	1½	6	4½	4½	3½	60	3	....	....	14	10½	11½	8
6	1	....	6½	5½	5½	3½	70	3	1	....	14½	10½	12	8½
7	1	....	6½	5½	5½	4	80	3	2	1	15½	11½	12½	8½
8	1	....	7½	5½	6½	4½	90	4	....	....	15½	11½	12½	8½
9	1	....	7½	5½	6½	4½	100	4	2	1	16	11½	13½	9½
10	1	1	8	6	6½	4½	125	4	3	1	16½	12½	13½	9½
12	2	....	8	6½	6½	5½	150	6	3	....	18½	13	14½	10½
14	2	1	8½	6½	7½	5½	175	7	3	1	19	14½	15½	10½
16	2	1	8½	7	7½	5½	200	9	3	1	20½	15½	16½	11½
18	3	1	9	7½	8	5½	225	10	1	1	20½	15½	16½	12½
20	1	....	....	10½	7½	8½	6	250	10	3	....	20	15½	17	11½
25	1	....	1	10½	8	8½	6	275	11	3	....	22	14½	16½	12½
30	1	1	1	11½	8½	9½	6½	300	12	2	....	22	16½	17½	12½

STEEL WIRE SCREENS.



Fig. D. 739.



Fig. D. 740.

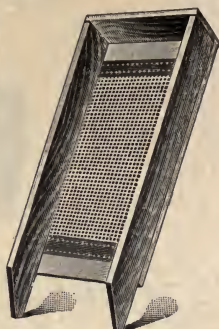


Fig. D. 741.

Sand Screen—Fig. D. 739.

Size.	Width.	Length.	Weight.	Price, Each.
Small.....	22 in.	60 in.	35 lbs.	\$ 6 00
Large.....	26 in.	66 in.	42 lbs.	7 50

Coal Screen—Fig. D. 740.

	Width.	Length.	Weight.	Price, Each.
No. 20 Regular.....	31 in.	69 in.	86 lbs.	\$12 00
No. 10 Extra.....	34 in.	76 in.	101 lbs.	15 00
2 With Footboard and Leg	31 in.	74 in.	106 lbs.	14 25
1 With Footboard and Leg	34 in.	81 in.	118 lbs.	17 25

When ordering always mention size mesh (hole) wanted. Any size mesh furnished.

Challenge Coal Screen—Fig. D. 741.

Size.	Width.	Length.	Weight.	Price, Each.
"Challenge".....	29 in.	71 in.	70 lbs.	\$7 50

Furnished with frame bolted together, \$1.25 each, *net*, extra.

Discount.....

COAL CHUTES.

For Hard and Soft Coal.



Fig. D. 742.

Tapered Wagon Chute.

Extensions made to fit small end of
above chute, also small end
of each other—\$0 75
per foot.

FOR HARD COAL.

No.	Width at Top.	Width at Bottom	Length.	Price, Each.
8	21 in.	12 in.	8 feet	\$6 00
10	21 in.	12 in.	10 feet	7 50
12	21 in.	12 in.	12 feet	9 00

FOR SOFT COAL.

85	21 in.	18 in.	8 feet	\$ 7 20
105	21 in.	18 in.	10 feet	9 00
125	21 in.	18 in.	12 feet	10 80

Any other length to order.

Discount.....

BRASS AND COPPER WIRE CLOTH.

Mesh is the distance from center to center of wire.

When ordering Netting, give length, width, mesh and size of wire wanted.



Fig. D. 743.

We can also furnish all grades of Iron or Steel Wire Cloth, from the Light Hardware grade to the heaviest Steel Crimped Locomotive and Mining Cloths; also, Tinned and Galvanized Cloths of all widths and meshes.

Owing to the confusion which is frequently caused by the difference in wire gauges, we would suggest that the decimal size of wire be given in all orders or inquiries for prices on wire cloth; thus:

100'x36" 8x8 mesh.

No. 16 (.063).

We are prepared to furnish promptly all sizes of Copper or Brass Wire Cloth and will be pleased to quote prices upon application.

PAINTED WIRE CLOTH FOR WINDOW SCREENS.

We are prepared to supply all widths, with selvedge edges, by the roll of 100 feet, painted green, 4 cents per square foot. Special prices for large lots.

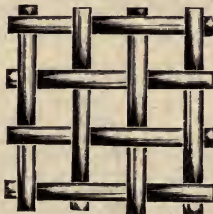
LOCOMOTIVE STACK NETTING.

Fig. D. 744.
Double Crimped.

The following is a list of the standard sizes:

- 2x2, No. 10 wire.
- 2½x2½, No. 10 wire.
- 3x3, No. 11 wire.
- 3½x3½, No. 12 wire.
- 4x4, No. 12 wire.

All Washburn & Moen standard gauge.

The above sizes are all sold by the pound. Special prices on light sizes and odd meshes quoted on application.

PERFORATED STEEL SPARK ARRESTERS AND DEFLECTOR PLATES.

Fig. D. 745.

We are prepared to furnish Perforated Steel for Spark Arresters promptly. In ordering, give size and style of holes and gauge of steel.

WIRE.

Brass, Bronze and Gilding Wire in coils.

Brown & Sharpe Gauge.

Extras over Base Prices.

	No. 8 and larger.	Nos. 9, 10 and 11.	Nos. 12, 13 and 14.	Nos. 15 and 16.	Nos. 17 and 18.	Nos. 19 and 20.	Nos. 21 and 22.	No. 23.	No. 24.
Round.....	Base	\$0 01	\$0 02	\$0 03	\$0 03½	\$0 04½	\$0 05½	\$0 06	\$0 06½
Flat, square and half round.....	\$0 04	05	06	07	07½	08½	09½	10	10½

Prices are for 100 pounds or more of one item of wire in coils in one order.

All wires between gauges take price of nearest gauge.

Price of flat wire is governed by thinner dimension.

Flat wire is material drawn in dies $\frac{1}{8}$ inch wide and narrower, .080 inch and thinner.

Round wire smaller than No. 11 to 20, inclusive, straightened and cut to length, 2 feet and over advance list 12 cents pound; under 2 feet, add to 12 cents pound the list advances for cutting rods of corresponding lengths.

Flat wire over $\frac{1}{8}$ inch to $\frac{3}{8}$ inch wide, inclusive, straightened and cut to length, same list advance as for cutting slit metal.

Spring Wire, 1 cent per pound additional over above list.

Brass Spooling Wire.

Weight on Spool.	5 lbs.	10 lbs.	15 lbs.	20 lbs.	25 lbs.
Spooling List Adv.	\$0 06	\$0 04	\$0 02	\$0 02	\$0 02
Net Cost of Spools, each	10	10	15	15	25

5 pound spools furnished in metal only, other sizes in wood only.

Spooling on spools other than above, special price quoted upon application.

Coiling in coils of 5 or 10 pounds, same list advance as for spooling corresponding weights.

Full credit given for spools returned in good condition to factory of manufacturers, *freight prepaid*.

Copper Wire.

Hard and Soft Drawn, Bare.

B. & S. Gauge	Price Pound Net	Stubbs' Gauge.
Nos. 0000 to 8.....	Base.....	Nos. 0000 to 10
	Extras.	
Nos. 9 and 10.....	Add $\frac{1}{2}$ cents lb.....	Nos. 11 and 12
Nos. 11 and 12.....	Add $\frac{1}{2}$ cents lb.....	Nos. 13 and 14
Nos. 13 and 14.....	Add $\frac{1}{2}$ cents lb.....	Nos. 15 and 16
Nos. 15 and 16.....	Add $\frac{1}{2}$ cents lb.....	Nos. 17 and 18
Nos. 17 and 18.....	Add 1 cents lb.....	Nos. 19
Nos. 19 and 20.....	Add 1½ cents lb.....	Nos. 20 and 21
Nos. 21 and 22.....	Add 1½ cents lb.....	Nos. 22 and 23
Nos. 23 and 24.....	Add 2½ cents lb.....	Nos. 24 and 25

For wire finer than 24 B. & S. Gauge, or shapes other than round, special prices upon application.

WIRE. Iron and Steel.

Nos.0000 to 9	10 and 11	12	13 and 14	15 and 16	17	18	20	22
Price, per lb., 10c.	11	11½	12½	14	15	16	20	22

The following varieties of wire are sold on above list with varying discounts.

Bright Market Wire	per cent.
Bright Charcoal Wire	"
Annealed Market Wire	"
Annealed Fence Wire, Nos. 8 and 9	"
Coppered Market Wire	"
Coppered Furniture Spring Wire	"
Annealed Bessemer Steel Wire	"
Galvanized Market Wire	"

Tinned Market Wire.

Nos.0 to 9	10 and 11	12 to 14	15 and 16	17	18
Price, per lb., 15c.	16	17	17½	18	18½

Discount

Galvanized Telegraph and Telephone Wire.
Of the Highest Electrical Qualities.
Prices on Application.

BRASS AND BRONZE RODS.

Brown & Sharpe Gauge.

Extras over Base Prices.

	Inc. No. 11 to ½ in.	Inc. ¼ in. to ⅜ in.	Inc. ⅜ in. to ½ in.	Inc. ⅝ in. Inc. 2 in.
Round.	\$0 06½	\$0 02	\$0 00½	Base
Hex., Oct. and Sq.	08½	04	02½	02
Rect. and Hf. Rnd.	10½	06	04½	04

Other sizes or shapes than listed above, special prices upon application.

Rods cut to uniform lengths, 2 feet and over, 1 cent list advance, except stock lengths of 8, 10 and 12 feet.

Rods cut to uniform lengths, less than 2 feet, add following list advances.

1 in. to 2 in.	2 in. to 4 in.	4 in. to 6 in.	6 in. to 9 in.	9 in. to 12 in.	12 in. to 24 in.
12c.	8c.	5c.	4c.	3c.	2c.

Shorter than 1 inch, special prices upon application.

BOLT AND WIRE CLIPPERS.

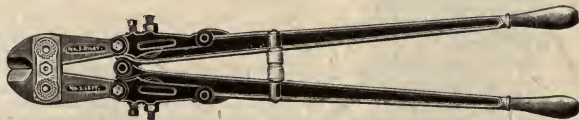


Fig. D. 746.

"New Easy" Bolt Clipper.

No. 0 for 5-16 in. bolts.	each \$3 75	No. 2 for 1-2 in. bolts.	each \$7 00
No. 1 for 3-8 in. bolts	" 5 00	No. 3 for 5-8 in. bolts	" 9 00

"Boston" Wire Cutter, with Insulated Handles.

No. 0	each \$5 50	No. 2 Opening to 1 1-8 in.	each \$ 9 00
No. 1 Opening to 3-4 in.	" 6 50	No. 3 Opening to 1 1-4 in.	" 12 00

Discount

BENDING TOOLS.

Eye Benders—Hand Power.

These machines will bend eyes, rings hooks, chain links, staples, "U"s, etc., in fact, the number of uses to which these tools can be put is almost unlimited.

Made in three sizes. The No. 1 takes stock up to and including $\frac{1}{2}$ inch. Bends rings and eyes up to $2\frac{1}{4}$ inches, outside diameter.

No. 2 takes stock up to and including $\frac{3}{4}$ inch. Bends rings and eyes up to 3 inches, outside diameter.

No. 3 will bend eyes up to 7 inches outside diameter from stock $1\frac{1}{2}$ inches, round or square, and flat stock for various purposes. Bends bridge eyes, loops, "U"s links for railroad, ship, bridge and structural iron work. Especially designed for bridge eyes and for bending any heavy work by hand.

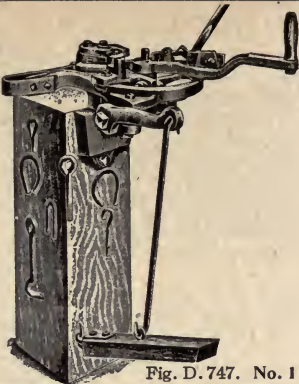


Fig. D. 747. No. 1

	No. 1.	No. 2.	No. 3.
Price, with one Forming Pin.....	\$20 00	\$25 00	\$50 00
" Forming Pins, any size.....	1 00	1 00	.....
" Forming Pins, up to $1\frac{1}{2}$ inch.....	.....	.....	1 00
" Forming Pins, $1\frac{1}{2}$ to 3 inches.....	.....	.....	1 50
" Forming Pins, 3 to 7 inches.....	.....	.....	2 00
" U Forms, cast.....	2 50	2 50	3 50
" U Forms, Steel.....	4 00	4 00	6 00

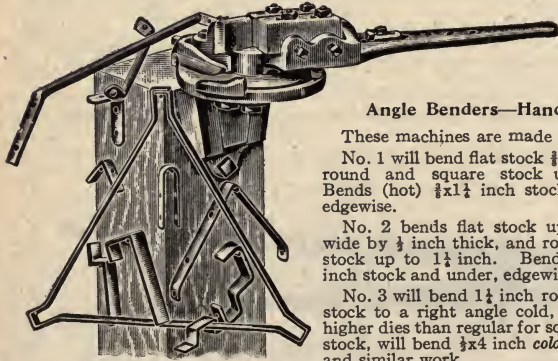


Fig. D. 748. No. 1.

Angle Benders—Hand Power.

These machines are made in three sizes.

No. 1 will bend flat stock $\frac{1}{2}$ x2 inches, and round and square stock up to $\frac{1}{2}$ inch. Bends (hot) $\frac{1}{2}$ x $1\frac{1}{2}$ inch stock, and under, edgewise.

No. 2 bends flat stock up to 4 inches wide by $\frac{1}{2}$ inch thick, and round or square stock up to $1\frac{1}{2}$ inch. Bends (hot) $\frac{1}{2}$ x $1\frac{1}{2}$ inch stock and under, edgewise.

No. 3 will bend $1\frac{1}{2}$ inch round or square stock to a right angle cold, and by using higher dies than regular for square or round stock, will bend $\frac{1}{2}$ x4 inch cold, for hangers, and similar work.

	No. 1.	No. 2.	No. 3.
Price, with one set Dies.....	\$18 00	\$30 00	\$50 00
" Extra Angle Iron Dies.....	2 00	3 00	3 50
" Extra Edge Bending Dies.....	4 00	4 50	.....
" Extra Odd Shaped Dies.....	2 00 to 4 00	2 00 to 4 00	3 00 to 5 00

Discount.....

ROLL AND SHEET BRASS.

*Common High Brass.

Brown & Sharpe Gauge.

List of July 1, 1913.

Extras Over Base Price.

Wider than and Including			In. 2 10	In. 10 12	In. 12 14	In. 14 16	In. 16 18	In. 18 20	In. 20 22	In. 22 24	In. 24 26	In. 26 28	In. 28 30	In. 30 32	In. 32 34	In. 34 36	In. 36 38	In. 38 40
To and inc.	No. 20.	.0319	Base															
	No. 21.	.0284	"	1	2 $\frac{1}{2}$	3	4	6	8	10	12	15	18	21	25	29	34	39
	No. 22.	.0253	"	1	2 $\frac{1}{2}$	4	6	8	10	12	15	18	21	25	29	34	39	46
	No. 23.	.0225	"	1	2 $\frac{1}{2}$	4	6	8	10	12	15	18	21	25	29	34	39	....
	No. 24.	.0201	"	1	2 $\frac{1}{2}$	4	6	8	10	12	15	18	21	25	29	34	39	....
	No. 25.	.0179	1	2	3 $\frac{1}{2}$	5	7	9	11	13	16	19	22	26	30	....	....	....
	No. 26.	.0159	1	2	3 $\frac{1}{2}$	5	7	9	11	13	16	19	22	26	30	....	....	....
	No. 27.	.0142	1	2 $\frac{1}{2}$	4	6	8	10	12	14	17	20	23	....	....	....	....	....
	No. 28.	.0126	1	2 $\frac{1}{2}$	4	6	8	10	12	14	17	20	23	....	....	....	....	....
	No. 29.	.0112	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	6 $\frac{1}{2}$	8 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{1}{2}$	14 $\frac{1}{2}$	17 $\frac{1}{2}$	20 $\frac{1}{2}$	23 $\frac{1}{2}$	....	....	....	....	....
	No. 30.	.0100	2	3 $\frac{1}{2}$	5	7	9	11	13	15	18	21	24	....	....	....	....	....
	No. 31.	.0089	2 $\frac{1}{2}$	4	5 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{2}$	11 $\frac{1}{2}$	13 $\frac{1}{2}$	15 $\frac{1}{2}$	18 $\frac{1}{2}$	....	....	....	....	....	....	....
	No. 32.	.0079	3	4 $\frac{1}{2}$	6	8	10	12	14	16	19	....	....	....	....	....	....	....
	No. 33.	.0071	4	5 $\frac{1}{2}$	7	9	11	13	15	....	....	....	....	....	....	....	....	....
	No. 34.	.0063	5	6 $\frac{1}{2}$	8	10	12	14	16	....	....	....	....	....	....	....	....	....
	No. 35.	.0056	6 $\frac{1}{2}$	8	9 $\frac{1}{2}$	11 $\frac{1}{2}$	13 $\frac{1}{2}$	15 $\frac{1}{2}$	....	....	....	....	....	....	....	....	....	....
	No. 36.	.0050	8	9 $\frac{1}{2}$	11	13	15	17	....	....	....	....	....	....	....	....	....	....

*The term "High Brass" refers to color, not to temper.

Nos. 37 and 38 B. & S. Gauge, prices quoted upon application.

All metal heavier than No. 6 gauge, listed and charged as sawed metal, whether sheared, slit or sawed.

Metal between gauges takes price of nearest gauge.

Circles cut from above metal, over 6 inches, and not exceeding 12 inches in diameter, No. 10 gauge and thinner..... 6centslistadvance.

Circles cut from above metal, over 6 inches, and not exceeding 12 inches in diameter, thicker than No. 10..... 10centslistadvance.

Circles cut from above metal, 6 inches and smaller and larger than 12 inches in diameter, special prices quoted upon application.

Segments, pattern sheets and irregular shape blanks, special prices quoted upon application.

Embossed Metal..... 4centslistadvance.

Polishing one side, No. 16 and heavier (per pound)..... 4centslistadvance.

Polishing one side, lighter than No. 16 (per square foot)..... 10centslistadvance.

Polishing both sides, double the above prices.

Sheet Metal extra leveled, special prices quoted upon application.

Sheet Metal, 14 inches wide and narrower, cut to uniform specific lengths, add the following list advances:

8in. to 2ft.	2ft. to 4ft.	4ft. to 6ft.	6ft. to 8ft.	8ft. to 10ft.
--------------	--------------	--------------	--------------	---------------

No Charge.	1c.	2c.	4c.	6c.
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10 feet and over, special prices quoted upon application, not less than 6 cents list advance.

Sheet Metal, 14 inches wide and narrower, cut to specific lengths, of less than 24 inches, or any multiple thereof, no charge for cutting.

Sheet Metal, 14 inches wide and narrower, cut to specific lengths, shorter than 8 inches, special prices quoted upon application, not less than 1 cent list advance.

Sheet Metal wider than 14 inches, cut to uniform specific lengths, special prices quoted upon application, not less than prices for cutting 14 inches wide.

HOT ROLLED SHEET COPPER.

Extras over Base Price.
Adopted January 29, 1913.

Sizes of Sheets.		64 oz. and Over	32 oz. to 64 oz.	24 oz. to 32 oz.	16 oz. to 24 oz.	15 oz.	14 oz.	13 oz.	12 oz.	11 oz.	10 oz.	9 oz.	8 oz.	Lighter than 8 oz.
		Cents per Pound.				Cents per Pound Over Base.								
Not wider than 30 in..	Not longer than 72 in.	base	base	base	base	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$4\frac{1}{2}$	6	9
	Longer than 72 in. . .	base	base	base	base	$\frac{1}{2}$	1	2	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	
	Not longer than 96 in.	base	base	base	base	$\frac{1}{2}$	1	2	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	
	Longer than 96 in. . .	base	base	base	base	$\frac{1}{2}$	1	2	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	
	Not longer than 120 in.	base	base	base	base	$\frac{1}{2}$	1	2	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	
Wider than 30 in. but not wider than 36 in..	Longer than 120 in. . .	base	base	base	base	$\frac{1}{2}$	1	2	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	
	Not longer than 72 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 72 in. . .	base	base	base	base	1	2	4	6	8	10			
	Not longer than 96 in.	base	base	base	base	1	2	4	6	8	10			
	Longer than 96 in. . .	base	base	base	base	1	2	4	6	8	10			
Wider than 36 in. but not wider than 48 in..	Not longer than 120 in.	base	base	base	base	1	2	4	6	8	10			
	Longer than 120 in. . .	base	base	base	base	1	2	4	6	8	10			
	Not longer than 72 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 72 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 48 in. but not wider than 60 in..	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 120 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 72 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 72 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 60 in. but not wider than 72 in..	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 120 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 72 in.	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 72 in. but not wider than 108 in.	Longer than 72 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 120 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 108 in. but not wider than 120 in.	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 120 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 72 in.	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 120 in. but not wider than 132 in.	Longer than 72 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 120 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
Wider than 132 in.	Not longer than 132 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 132 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 96 in.	base	base	base	base	1	2	3	4	6	8	10	12	
	Longer than 96 in. . .	base	base	base	base	1	2	3	4	6	8	10	12	
	Not longer than 120 in.	base	base	base	base	1	2	3	4	6	8	10	12	

SHEET COPPER.

In speaking of Sheet Copper of so many pounds weight, it is always understood that such a thickness is meant that a sheet 30x60 inches in size, of that thickness, will weigh the given number of pounds.

Illustrations: A 30x60, 25 pound sheet would weigh just 25 pounds; but
A 50x84, 25 pound sheet, being of same thickness, would weigh 58½ pounds.

Prices upon application.

Extras on Sheet Copper.

Circles, Segments and Pattern Sheets, 3c per pound advance over prices of sheet copper required to cut them from.

Circles less than 8 in. diam., 2c per pound additional.

All **Cold or Hard Rolled Copper**, 14 oz. per square foot and heavier, 1c per pound over the foregoing prices of sheet copper.

All **Cold or Hard Rolled Copper**, lighter than 14 oz. per square foot 2c per pound over the foregoing prices of sheet copper.

Cold Rolled and Annealed Copper sheets and circles, take the same price as cold or hard rolled copper of corresponding dimensions and thickness.

All **Polished Copper**, 20 inches wide and under, 1c per square foot advance over the price for cold rolled copper.

For polishing both sides, double the above price.

The polishing extra for **Circles** and **Segments** to be charged on the full size of the sheet from which they are cut.

All **Polished Copper** over 20 inches wide, 2c per square foot advance over the price for cold rolled copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as polished copper.

All **Planished Copper**, 1c per pound advance over the price of polished copper.

Tinning.

Tinning Sheets, on one side (all sizes).....	per square foot	3½c
“ “ both sides (all sizes).....	“ “	7 c

For tinning the edges of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

For tinning or polishing circles and segments the prices per square foot are based upon the square of the circle, or the sheet from which the segment is cut.

BAR COPPER.

Round — Square — Rectangular
Prices upon application.

SEAMLESS BRASS TUBING.

Stubbs' Wire Gauge Standard—Outside Diameter.

Adopted November 13, 1908.

Extras Over Base Price Brass Tubes.

Stubbs' Gauge.	Decimal Equivalents.	$\frac{1}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	2	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$
4 to 11	.238 to .120	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	.109	...	...	...	...	6	5	5	5	...	...	...	...	...	...	...	...	...	...
13 or $\frac{3}{16}$	.095	...	...	...	...	7	5	5	5	...	...	...	...	...	...	...	...	...	...
14	.083	...	...	7	7	7	5	5	5	1	1	1	1	1	1	1	1	1	1
15	.072	...	8	7	7	7	5	5	5	1	1	1	1	1	1	1	1	1	1
16 or $\frac{1}{8}$	.065	...	8	8	7	7	5	5	5	2	2	2	2	2	2	2	2	2	5
17	.058	8	8	7	7	7	5	5	5	3	3	3	3	3	3	3	3	5	6
18	.049	9	9	8	8	8	6	6	6	4	4	4	4	4	4	4	6	7	8
19	.042	9	9	8	8	8	6	6	6	5	5	5	5	5	5	7	8	9	10
20	.035	9	9	8	8	8	6	6	6	6	6	6	6	6	7	7	8	9	11
21 or $\frac{1}{16}$	.032	11	10	10	8	8	7	7	7	7	7	7	7	7	...	...	...	...	...
22	.028	13	13	11	11	9	8	8	8	8	8	8	8	8	...	...	...	...	...
23	.025	15	15	13	13	11	11	11	11	11	11	11	13	15	...	...	...	...	...
24	.022	31	26	24	23	22	21	19	18	18	19	19	20	21	...	...	...	...	...
25	.020	34	29	27	25	24	23	22	22	23	24	...	...	...	...	...	...	...	...

Continued below

Stubbs' Gauge.	Decimal Equivalents.	$3\frac{1}{4}$	4	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{3}{4}$	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6	$6\frac{1}{4}$	$6\frac{1}{2}$	$6\frac{3}{4}$	7	$7\frac{1}{4}$	$7\frac{1}{2}$	$7\frac{3}{4}$	8	$8\frac{1}{4}$	9	$9\frac{1}{4}$	10
4 to 11	.238 to .120	1	1	1	3	3	5	5	6	6	7	7	7	7	7	9	9	9	11	11	11	14	17
12	.109	2	2	2	4	4	6	6	7	7	8	8	8	8	8	10	10	10	12	12	12	15	18
13 or $\frac{3}{16}$	.095	3	3	3	5	5	7	7	8	8	9	9	9	9	9	11	11	11	13	13	13	16	19
14	.083	4	4	4	6	6	8	8	9	9	10	10	10	10	10	12	12	12	14	14	14	...	...
15	.072	6	6	6	7	7	9	9	11	11	14	14	14	16	16	19	19	19	...	...	...	...	...
16 or $\frac{1}{8}$	.065	6	7	8	11	11	11	16	16	16	19	19	23	23	23	26	26	26	...	...	...	...	...
17	.058	7	8	9	12	12	17	17	17	20	20	24	24	24	24	27	27	27	...	...	...	...	...
18	.049	9	10	11	14	14	20	20	20	23	23	30	30	30	30	...	...	...	...	...	...	...	...
19	.042	11	13	15	17	21	21	25	29	31	31	...	...	...	...	...	...	...	...	...	...	...	...
20	.035	11	13	19	19	23	23	31	31	...	...	...	...	...	...	...	...	...	...	...	...	...	...

NOTE.—For diameters of the fractional parts of an inch where no price is given, take the column to the left of where such size would appear if designated.—Thus: $1\frac{1}{4}$ would go at price of $1\frac{1}{2}$ inches; $1\frac{1}{8}$ at the price of 1 inch; $5\frac{1}{8}$ at the price of 5 inches.

SEAMLESS DRAWN BRASS AND COPPER TUBES.

Iron Pipe Sizes—BRASS

Extras over Base Price Brass Tubes.

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7	8 inch.
8	7	2	1			Base Price						1	2	4	6	7	9 11c

To ascertain price of copper, bronze, gilding, low brass and Admiralty tubes, add the following advances to price of brass tubes:

Copper tubes 4 cents per pound.

Bronze and gilding tubes 4 cents per pound.

Low brass tubes 4 cents per pound.

Admiralty tubes 4 cents per pound.

Additional charge for cutting tube to exact lengths, if required 24 ins. or less:

Tubes cut over 12 in. and up to 24 in., inclusive, 1 cent per lb. advance on above list.

"	"	9	"	12	"	1 $\frac{1}{2}$	"	"	"	"	"	"	"	"	"	"	"
"	"	6	"	"	9	"	"	2	"	"	"	"	"	"	"	"	"
"	"	4	"	"	6	"	"	2 $\frac{1}{2}$	"	"	"	"	"	"	"	"	"
"	"	2	"	"	4	"	"	3	"	"	"	"	"	"	"	"	"
"	"	1	"	"	2	"	"	3 $\frac{1}{2}$	"	"	"	"	"	"	"	"	"
"	"	$\frac{3}{4}$	"	"	1	"	"	4	"	"	"	"	"	"	"	"	"

CONDENSER TUBES.

Extras over Base Price Brass Tubes.

Brass.

Admiralty.

Stubbs' Gauge		$\frac{1}{8}$ inch.	$\frac{1}{4}$ inch.	$\frac{3}{8}$ inch.	1 inch.	$\frac{1}{8}$ inch.	$\frac{1}{4}$ inch.	$\frac{3}{8}$ inch.	1 inch.
16	.065	4	4	4	4	8	8	8	8
17	.058	4	4	4	4	8	8	8	8
18	.049	4	4	4	4	8	8	8	8
19	.042	6	6	6	6	10	10	10	10
20	.035	8	6	6	6	12	10	10	10

For Tinning Inside and Outside 2 Cents Per Pound Extra.

For all seamless tubes of any shape other than round, add to above price of regular round tubes of corresponding size.....5 cents per lb.

For tinning tubes inside and outside other than brass condenser tubes of sizes above specified.....add 4 " " "

For tinning any size or kind of tube on one side only.....add 5 " " "

For tinning tubes in lengths not over three inches on ends only, an extra charge of not less than..... 1 " " end

BRASS FITTINGS.

Iron Pipe Size—Rough.

Size.....Inches.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Elbows.....ea.	\$0 12	\$0 17	\$0 21	\$0 28	\$0 35	\$0 50	\$0 85	\$1 10	\$1 50
Tees....."	15	20	30	40	50	75	1 00	1 30	1 75
Crosses....."	20	30	40	50	60	80	1 50	2 00	3 50
Plugs....."	9	10	12	15	20	28	40	50	90
Caps....."	15	15	20	25	35	45	60	80	1 10
Lock Nuts....."	10	10	12	15	20	30	45	70	95
Reducers....."	.....	16	22	32	45	65	90	1 12	1 85
Bushings, to reduce 1 size	.....	10	12	14	21	38	50	67	1 00
Couplings....."	10	14	16	25	37	50	60	90	1 35
Return bends, open pat.	.....	.....	.....	70	88	1 25	2 15	2 75	3 75
Nipples, 4 in. and under	15	20	30	35	45	60	90	1 25	1 60

Discount.....

STANDARD HOISTING ROPE.



Fig. D. 749.

Composed of 6 Strands and a Hemp Center, 19 Wires to the Strand.
Swedish Iron.

Trade Number.	Price per Foot.	Diameter in Inches.	Ap. circum- ference in Inches.	Weight per Foot in lbs.	Ap. Break- ing Strain in Tons of 2,000 lbs.	Allowable work strain in Tons of 2,000 lbs.	Min. Size of Drum or Sheave in Foot.
00	\$ 1.70	2 $\frac{3}{4}$	8 $\frac{1}{2}$	11.95	111	22.2	17
0	1.40	2 $\frac{3}{4}$	7 $\frac{1}{4}$	9.85	92	18.4	15
1	1.17	2 $\frac{3}{4}$	7 $\frac{1}{4}$	8.	72	14.4	14
2	.95	2	6 $\frac{1}{4}$	6.30	55	11	12
2 $\frac{1}{2}$	.88	1 $\frac{1}{2}$	5 $\frac{1}{2}$	5.55	50	10	12
3	.80	1 $\frac{1}{2}$	5 $\frac{1}{2}$	4.85	44	8.8	11
4	.65	1 $\frac{1}{2}$	5	4.15	38	7.6	10
5	.57	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3.55	33	6.5	9
5 $\frac{1}{2}$	.49	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3.	28	5.6	8.5
6	.40	1 $\frac{1}{2}$	4	2.45	22.8	4.56	7.5
7	.33	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2.	18.6	3.72	7
8	.26	1	3	1.58	14.5	2.90	6
9	.20	1	2 $\frac{3}{4}$	1.20	11.8	2.36	5.5
10	.16	1	2 $\frac{1}{4}$	.89	8.5	1.70	4.5
10 $\frac{1}{2}$	.12	1	2	.62	6	1.20	4
10 $\frac{3}{4}$	.10	1 $\frac{1}{2}$	1 $\frac{3}{4}$	.50	4.7	.94	3.5
10 $\frac{1}{2}$	.08 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.39	3.9	.78	3
10a	.07 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.30	2.9	.58	2.75
10b	.07	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.22	2.4	.48	2.25
10c	.06 $\frac{1}{2}$	1 $\frac{1}{2}$	1	.15	1.5	.30	2
10d	.06 $\frac{1}{2}$	1 $\frac{1}{2}$	1	.10	1.1	.22	1.50

Crucible Steel.

00	\$2.10	2 $\frac{3}{4}$	8 $\frac{1}{2}$	11.95	211	42.2	11
0	1.75	2 $\frac{3}{4}$	7 $\frac{1}{4}$	9.85	170	34	10
1	1.44	2 $\frac{3}{4}$	7 $\frac{1}{4}$	8.00	133	26.6	9
2	1.16	2	6 $\frac{1}{4}$	6.30	106	21.2	8
2 $\frac{1}{2}$	1.02	1 $\frac{1}{2}$	5 $\frac{1}{2}$	5.55	96	19	8
3	.90	1 $\frac{1}{2}$	5 $\frac{1}{2}$	4.85	85	17	7
4	.77	1 $\frac{1}{2}$	5	4.15	72	14.4	6.5
5	.66	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3.55	64	12.8	6
5 $\frac{1}{2}$	.56	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3.	56	11.2	5.5
6	.46	1 $\frac{1}{2}$	4	2.45	47	9.4	5
7	.38	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2.	38	7.6	4.5
8	.31	1	3	1.58	30	6	4
9	.24	1	2 $\frac{3}{4}$	1.20	23	4.6	3.5
10	.19	1	2 $\frac{1}{4}$	.89	17.5	3.5	3
10 $\frac{1}{2}$	.14	1	2	.62	12.5	2.5	2.50
10 $\frac{3}{4}$	.12	1 $\frac{1}{2}$	1 $\frac{3}{4}$	.50	10	2	2.25
10 $\frac{1}{2}$	.11	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.39	8.4	1.68	2
10a	.10	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.30	6.5	1.30	1.75
10b	.9 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.22	4.8	.96	1.50
10c	.09 $\frac{1}{2}$	1 $\frac{1}{2}$	1	.15	3.1	.62	1.25
10d	.09	1 $\frac{1}{2}$	1	.10	2.2	.44	1

NOTE.—When the Iron or Steel Rope named above is Galvanized or Tinned, add 10 per cent. to list price per foot. When made with Wire Center, add 10 per cent. to list price per foot.

Discount.....

TRANSMISSION AND HAULAGE ROPE.



Fig. D. 750.

Composed of 6 Strands and a Hemp Center, 7 Wires to the Strand.
Swedish Iron.

Trade Number.	Price per Foot.	Diameter in Inches.	Approximate Circumference in Inches.	Weight per Foot in Pounds.	Approximate Breaking-Strain in Tons of 2,000 Pounds.	Allowable Working Strain in Tons of 2,000 Pounds.	Minimum Size of Drum or Sheave in Feet.
11	\$0.51	1½	4½	3.55	32	6.4	16
12	43	1¼	4¼	3	28	5.6	15
13	36	1¼	4	2.45	23	4.6	13
14	30	1¼	3½	2	19	3.8	12
15	24	1	3	1.58	15	3	10.5
16	18½	¾	2¾	1.20	12	2.4	9
17	14	¾	2¼	.89	8.8	1.7	7.5
18	12	¾	2½	.75	7.3	1.5	7.25
19	10	¾	2	.62	6	1.2	7
20	08½	¾	1¾	.50	4.8	.96	6
21	06½	¾	1½	.39	3.7	.74	5.5
22	05½	¾	1¼	.30	2.6	.52	4.5
23	04½	¾	1½	.22	2.2	.44	4
24	03½	¾	1	.15	1.7	.34	3.5
25	03½	¾	¾	.125	1.2	.24	3

Crucible Steel.

11	\$0.60	1½	4½	3.55	63	12.6	11
12	51	1¼	4¼	3	53	10.6	10
13	43	1¼	4	2.45	46	9.2	9
14	36	1¼	3½	2	37	7.4	8
15	29	1	3	1.58	31	6.2	7
16	22½	¾	2¾	1.20	24	4.8	6
17	17	¾	2¼	.89	18.6	3.7	5
18	14½	¾	2½	.75	15.4	3.1	4½
19	12	¾	2	.62	13	2.6	4½
20	10	¾	1¾	.50	10	2	4
21	08	¾	1½	.39	7.7	1.5	3½
22	06½	¾	1¼	.30	5.5	1.1	3
23	05½	¾	1½	.22	4.6	.92	2½
24	04½	¾	1	.15	3.5	.70	2½
25	04	¾	¾	.125	2.5	.50	1½

NOTE.—When the Iron or Steel rope named above is Galvanized or Tinned, add 10 per cent. to list price per foot. When made with **Wire Center**, add 10 per cent. to list price per foot.

Discount.....

MILD PLOUGH STEEL ROPE.



Fig. D. 751.

Composed of 6 Strands and a Hemp Center, 19 Wires to the Strand.

Trade Number.	Price per Foot.	Diameter in Inches.	Approximate Circumference in Inches.	Weight per Foot in Pounds.	Approximate Breaking Strain in Tons of 2,000 Pounds.	Allowable Working Strain in Tons of 2,000 Pounds.	Minimum Size of Drum or Sheave in Feet.
00	\$2.55	2 $\frac{3}{4}$	8 $\frac{3}{4}$	11.95	243	48.6	11
0	2.10	2 $\frac{3}{4}$	7 $\frac{3}{4}$	9.85	200	40	10
1	1.70	2 $\frac{3}{4}$	7 $\frac{3}{4}$	8	160	32	9
2	1.34	2	6 $\frac{1}{4}$	6.30	123	24.6	8
2 $\frac{1}{2}$	1.25	1 $\frac{7}{8}$	5 $\frac{1}{2}$	5.55	112	22.4	8
3	1.10	1 $\frac{7}{8}$	5 $\frac{1}{2}$	4.85	99	19.8	7
4	.94	1 $\frac{7}{8}$	5	4.15	83	16.6	6.5
5	.80	1 $\frac{7}{8}$	4 $\frac{3}{4}$	3.55	73	14.6	6
5 $\frac{1}{2}$	.68	1 $\frac{7}{8}$	4 $\frac{1}{4}$	3	64	12.8	5.5
6	.56	1 $\frac{1}{2}$	4	2.45	53	10.6	5
7	.46	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2	43	8.6	4.5
8	.37	1	3	1.58	34	6.80	4
9	.29	$\frac{7}{8}$	2 $\frac{3}{4}$	1.20	26	5.20	3.5
10	.22	$\frac{7}{8}$	2 $\frac{1}{4}$	.89	20.2	4.04	3
10 $\frac{1}{4}$	.16 $\frac{1}{2}$	$\frac{7}{8}$	2	.62	14	2.80	2.5
10 $\frac{1}{2}$	.14	$\frac{7}{8}$	1 $\frac{3}{4}$	.50	11.2	2.24	2.25
10 $\frac{3}{4}$	.12 $\frac{1}{2}$	$\frac{7}{8}$	1 $\frac{3}{4}$	.39	9.2	1.84	2
10a	.11 $\frac{1}{2}$	$\frac{7}{8}$	1 $\frac{1}{4}$	.30	7.25	1.45	1.75
10b	.11	$\frac{7}{8}$	1 $\frac{1}{4}$	.22	5.30	1.06	1.50
10c	.10 $\frac{3}{4}$	$\frac{7}{8}$	1	.15	3.50	.70	1.25
10d	.10 $\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{4}$	.10	2.43	.49	1

7 Wires to the Strand.

11	\$0.75	1 $\frac{1}{2}$	4 $\frac{1}{4}$	3.55	73	14.6	11
12	.64	1 $\frac{1}{2}$	4 $\frac{1}{4}$	3	63	12.6	10
13	.53	1 $\frac{1}{2}$	4	2.45	54	10.8	9
14	.44	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2	43	8.6	8
15	.35	1	3	1.58	35	7	7
16	.27	$\frac{7}{8}$	2 $\frac{3}{4}$	1.20	28	5.6	6
17	.20	$\frac{7}{8}$	2 $\frac{1}{4}$	.89	21	4.2	5
18	.17	$\frac{7}{8}$	2 $\frac{1}{4}$	.75	16.7	3.3	4 $\frac{1}{4}$
19	.14 $\frac{1}{4}$	$\frac{7}{8}$	2	.62	14.5	2.9	4 $\frac{1}{2}$
20	.12	$\frac{7}{8}$	1 $\frac{3}{4}$	.50	11	2.2	4
21	.09 $\frac{1}{2}$	$\frac{7}{8}$	1 $\frac{3}{4}$	.39	8.85	1.8	3 $\frac{1}{2}$
22	.07 $\frac{1}{2}$	$\frac{7}{8}$	1 $\frac{1}{4}$	.30	6.25	1.25	3
23	.06	$\frac{7}{8}$	1 $\frac{1}{4}$	.22	5.25	1.05	2 $\frac{3}{4}$
24	.05 $\frac{1}{2}$	$\frac{7}{8}$	1	.15	3.95	.79	2 $\frac{1}{4}$
25	.05	$\frac{7}{8}$	$\frac{3}{4}$	.125	2.95	.59	1 $\frac{1}{2}$

NOTE.—When the Rope named above is Galvanized or Tinned, add 10 per cent. to list price per foot. When made with Wire Center, add 10 per cent. to list price per foot.

Discount.....

PLOUGH STEEL ROPE.



Fig. D. 752.

Composed of 6 Strands and a Hemp Center, 19 Wires to the Strand.

Trade Number.	Price - Per Foot.	Diameter in Inches.	Approximate Circumference in Inches.	Weight per Foot in Pounds.	Approximate Breaking Strain in Tons of 2,000 Pounds.	Allowable Working Strain in Tons of 2,000 Pounds.	Minimum Size of Drum or Sheave in Feet.
00	\$3.00	2 $\frac{1}{4}$	8 $\frac{5}{8}$	11.95	275	55	11
0	2.50	2 $\frac{1}{4}$	7 $\frac{7}{8}$	9.85	229	46	10
1	2.00	2 $\frac{1}{4}$	7 $\frac{7}{8}$	8	168	37	9
2	1.58	2	6 $\frac{1}{2}$	6.30	140	28	8
2 $\frac{1}{2}$	1.46	1 $\frac{7}{8}$	5 $\frac{3}{4}$	5.55	127	25	8
3	1.30	1 $\frac{7}{8}$	5 $\frac{3}{4}$	4.85	112	22	7
4	1.08	1 $\frac{5}{8}$	5	4.15	94	19	6.5
5	.93	1 $\frac{5}{8}$	4 $\frac{1}{2}$	3.55	82	16	6
5 $\frac{1}{2}$	.79	1 $\frac{5}{8}$	4 $\frac{1}{2}$	3	72	14	5.5
6	.65	1 $\frac{1}{2}$	4	2.45	58	12	5
7	.54	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2	47	9.4	4.5
8	.43	1	3	1.58	38	7.6	4
9	.34	7 $\frac{7}{8}$	2 $\frac{1}{2}$	1.20	29	5.8	3.5
10	.26	7 $\frac{7}{8}$	2 $\frac{1}{2}$	.89	23	4.6	3
10 $\frac{1}{2}$	.19	7 $\frac{7}{8}$	2	.62	15.5	3.1	2.5
10 $\frac{3}{4}$	.16	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.50	12.3	2.4	2.25
10 $\frac{1}{2}$	.14	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.39	10	2	2
10a	.13	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.30	8	1.6	1.75
10b	.12 $\frac{1}{2}$	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.22	5.75	1.15	1.50
10c	.12 $\frac{1}{2}$	7 $\frac{7}{8}$	1	.15	3.8	.76	1.25
10d	.12	7 $\frac{7}{8}$	7 $\frac{7}{8}$	.10	2.65	.53	1

7 Wires to the Strand.

11	\$0.90	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3.55	82	16.4	11
12	.76	1 $\frac{1}{2}$	4 $\frac{1}{2}$	3	72	14.4	10
13	.62	1 $\frac{1}{2}$	4	2.45	60	12	9
14	.51	1 $\frac{1}{2}$	3 $\frac{1}{2}$	2	47	9.4	8
15	.41	1	3	1.58	38	7.6	7
16	.32	7 $\frac{7}{8}$	2 $\frac{1}{2}$	1.20	31	6.2	6
17	.24 $\frac{1}{2}$	7 $\frac{7}{8}$	2 $\frac{1}{2}$	.89	23	4.6	5
18	.21	7 $\frac{7}{8}$	2 $\frac{1}{2}$	.75	18	3.6	4 $\frac{1}{2}$
19	.17 $\frac{1}{2}$	7 $\frac{7}{8}$	2	.62	16	3.2	4 $\frac{1}{2}$
20	.14 $\frac{1}{2}$	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.50	12	2.4	4
21	.11 $\frac{1}{2}$	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.39	10	2	3 $\frac{1}{2}$
22	.09	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.30	7	1.4	3
23	.06 $\frac{1}{2}$	7 $\frac{7}{8}$	1 $\frac{1}{2}$	.22	5.9	1.2	2 $\frac{1}{2}$
24	.06	7 $\frac{7}{8}$	1	.15	4.4	.88	2 $\frac{1}{2}$
25	.05 $\frac{1}{2}$	7 $\frac{7}{8}$	7 $\frac{7}{8}$	.125	3.4	.68	1 $\frac{1}{2}$

NOTE.—When the Rope named above is Galvanized or Tinned, add 10 per cent. to list price per foot. When made with Wire Center, add 10 per cent. to list price per foot.

Discount.....

MONARCH WIRE ROPE.

Hoisting Rope.



Fig. D. 753.

Composed of 6 Strands and a Hemp Center, 19 Wires to the Strand.

Trade Number.	Approximate Circumference in Inches.	Diameter in Inches.	Price per Foot	Weight per Foot in Pounds.	Approximate Breaking Strain in Tons of 2,000 Pounds.	Proper Working Strains in Tons of 2,000 Pounds.	Minimum Size of Drum or Sheave in Feet.
00	8 $\frac{5}{8}$	2 $\frac{3}{4}$	\$3 45	11.95	315	63	11
0	7 $\frac{7}{8}$	2 $\frac{1}{2}$	2 80	9.85	263	53	10
1	7 $\frac{1}{2}$	2 $\frac{1}{4}$	2 50	8	210	42	9
2	6 $\frac{1}{2}$	2	1 85	6.30	166	33	8
3	5 $\frac{5}{8}$	1 $\frac{3}{4}$	1 60	4.85	133	27	7
4	5 $\frac{1}{2}$	1 $\frac{5}{8}$	1 30	4.15	110	22	6 $\frac{1}{2}$
5	4 $\frac{3}{4}$	1 $\frac{1}{2}$	1 10	3.55	98	20	6
6	4	1 $\frac{1}{4}$	75	2.45	69	14	5
7	3 $\frac{3}{4}$	1 $\frac{1}{8}$	62	2	56	11	4 $\frac{1}{2}$
8	3	1	50	1.58	45	9	4
9	2 $\frac{3}{4}$	$\frac{7}{8}$	39	1.20	35	7	3 $\frac{1}{2}$
10	2 $\frac{1}{4}$	$\frac{3}{4}$	31	.89	26.3	5.3	3
10 $\frac{1}{2}$	2	$\frac{5}{8}$	22 $\frac{1}{2}$	.62	19	3.8	2 $\frac{1}{2}$
10 $\frac{3}{4}$	1 $\frac{3}{4}$	$\frac{5}{8}$	19	.50	14.5	2.9	2 $\frac{1}{4}$
10 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	17	.39	12.1	2.4	2

7 Wires to the Strand.

11	4 $\frac{1}{2}$	1 $\frac{1}{2}$	\$1 05	3.55	90	18	11
12	4 $\frac{1}{4}$	1 $\frac{3}{8}$	88	3	79	16	10
13	4	1 $\frac{1}{4}$	72	2.45	67	13	9
14	3 $\frac{1}{2}$	1 $\frac{1}{8}$	58	2	52	10	8
15	3	1	48	1.58	42	8.4	7
16	2 $\frac{3}{4}$	$\frac{7}{8}$	37	1.20	33	6.6	6
17	2 $\frac{1}{4}$	$\frac{3}{4}$	28 $\frac{1}{2}$	.89	25	5	5
18	2 $\frac{1}{8}$	$\frac{11}{16}$	24 $\frac{1}{2}$	.75	20	4	4 $\frac{1}{2}$
19	2	$\frac{1}{2}$	20 $\frac{1}{2}$	.62	17 $\frac{1}{2}$	3.5	4 $\frac{1}{4}$
20	1 $\frac{3}{4}$	$\frac{1}{2}$	17	.50	13	2.6	4
21	1 $\frac{1}{2}$	$\frac{1}{2}$	13 $\frac{1}{2}$	.39	11	2.2	3 $\frac{1}{2}$
22	1 $\frac{1}{4}$	$\frac{1}{2}$	11 $\frac{1}{2}$	.30	7 $\frac{1}{2}$	1.5	3
23	1 $\frac{1}{8}$	$\frac{1}{2}$	08 $\frac{1}{2}$	.22	1 $\frac{1}{2}$	1.3	2 $\frac{1}{2}$

NOTE—When the Rope named above is Galvanized or Tinned, add 10 per cent. to list price. When made with Wire Center, add 10 per cent. to list price.

Discount.....

GALVANIZED STEEL WIRE STRAND.



Fig. D. 754.

For Smokestack Guys, Signal Strand, Trolley Line Span Wire
and Other Purposes.

Composed of 7 Wires Twisted Together.

Price per 100 Feet.	Diameter in Inches.	Composed of 7 Wires. Gauge No.	Weight per 100 Feet in Pounds.	Approximate Breaking Strain in Pounds.
\$5 50	$\frac{1}{2}$	8	52	8,500
4 50	$\frac{7}{16}$	10	40	6,500
3 50	$\frac{3}{8}$	11	30	5,000
2 25	$\frac{1}{2}$	12	22	3,800
1 75	$\frac{1}{2}$	15	13	2,300
1 25	$\frac{3}{16}$	17	8	1,400
1 15	$\frac{3}{16}$	18	5	900
1 00	$\frac{1}{8}$	19	3.2	500
80	$\frac{3}{8}$	21	2	400

Discount.....

SASH CORDS.

Composed of 6 Strands and a Cotton Center, 7 Wires to the Strand.

Trade No.	Diam. in Inches.	Price per Foot.		Estimated Weight per Foot in Pounds.	Approximate Breaking Strain in Pounds.	
		Iron.	Tinned or Gal. Iron.		Bright.	Annealed.
26	$\frac{1}{2}$	\$0 03	\$0 04	0.100	2200	1600
27	$\frac{3}{4}$	02 $\frac{1}{2}$	03 $\frac{1}{2}$	0.076	1809	1254
27 $\frac{1}{2}$	$\frac{3}{8}$	02 $\frac{1}{4}$	03	0.056	1417	947
28	$\frac{1}{4}$	01 $\frac{1}{4}$	02 $\frac{1}{4}$	0.025	790	467
28 $\frac{1}{2}$	$\frac{3}{8}$	01 $\frac{1}{2}$	02	0.014	510	280
29	$\frac{1}{8}$	01 $\frac{1}{4}$	01 $\frac{1}{4}$	0.006	262	132

Annealed Sash Cords at Same Prices as Bright.

Discount.....

WIRE ROPE FASTENINGS.

"Crosby" Clips.

Fig. D. 755
"Crosby" Clip.

Diam. Rope, inches..	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Price, each	\$0 35	35	40	45	45	55	65	75	85

Diam. Rope, inches..	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$
Price, each	\$0 95	1 10	1 25	1 50	3 50	5 50	7 50	9 50	11 50

Discount.....

Hooks and Thimbles.



Fig. D. 756.

Diameter.	For Steel Rope.		Diameter.	For Steel Rope.	
	Loose.	Fastened.		Loose.	Fastened.
$\frac{3}{8}$	\$0 70	\$1 85	1	\$3 75	\$ 6 70
$\frac{1}{2}$	80	2 05	$1\frac{1}{8}$	4 40	8 15
$\frac{5}{8}$	1 40	2 85	$1\frac{1}{4}$	4 60	9 20
$\frac{3}{4}$	1 85	3 75	$1\frac{1}{2}$	7 00	13 50
$\frac{7}{8}$	2 90	5 35			

Discount.....

Galvanized Oval Wire Rope Thimbles—Extra Heavy.



Fig. D. 756½.

Diam. of Rope.	Price, Each.	Diam. of Rope.	Price, Each.	Diam. of Rope.	Price, Each.	Diam. of Rope.	Price, Each.
$\frac{1}{4}$	\$0 08	$\frac{1}{2}$	\$0 11	$\frac{7}{8}$	\$0 16	$1\frac{3}{8}$	\$0 42
$\frac{3}{8}$	08	$\frac{5}{8}$	13	1	20	$1\frac{1}{2}$	50
$\frac{1}{2}$	09	$\frac{3}{4}$	15	$1\frac{1}{8}$	25		
$\frac{3}{4}$	10			$1\frac{1}{4}$	33		

Discount.....

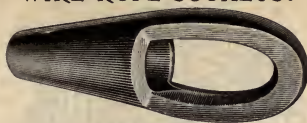
WIRE ROPE SOCKETS.

Fig. D. 757.

Closed Sockets. For Steel Rope.

Diameter.	Loose.	Fastened.	Diameter.	Loose.	Fastened.
$\frac{3}{8}$	\$0 85	\$1 85	$1\frac{1}{4}$	\$ 4 50	\$ 8 00
$\frac{1}{2}$	1 10	2 25	$1\frac{3}{8}$	6 00	10 25
$\frac{5}{8}$	1 35	2 65	$1\frac{1}{2}$	6 80	11 80
$\frac{3}{4}$	1 65	3 15	$1\frac{5}{8}$	12 00	18 00
$\frac{7}{8}$	1 85	3 85	$1\frac{3}{4}$	13 00	21 00
1	2 40	4 65	2	16 00	25 50
$1\frac{1}{8}$	3 30	6 15	$2\frac{1}{4}$	21 00	32 00

Discount.....

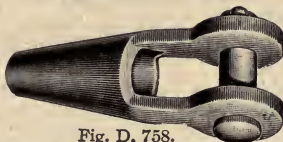


Fig. D. 758.

Open Sockets. For Steel Rope.

Diameter.	Loose.	Fastened.	Diameter.	Loose.	Fastened.
$\frac{3}{8}$	\$1 00	\$2 00	$1\frac{1}{4}$	\$ 6 10	\$ 9 60
$\frac{1}{2}$	1 35	2 50	$1\frac{3}{8}$	7 50	11 75
$\frac{5}{8}$	1 65	2 95	$1\frac{1}{2}$	8 00	13 00
$\frac{3}{4}$	2 10	3 60	$1\frac{5}{8}$	13 00	19 00
$\frac{7}{8}$	2 50	4 50	$1\frac{3}{4}$	15 50	23 50
1	3 15	5 40	2	16 50	26 00
$1\frac{1}{8}$	4 50	7 35	$2\frac{1}{4}$	23 00	34 00

Discount.....

HAWSER LAID ROPE.In stock, $\frac{1}{4}$ to $2\frac{1}{2}$ -inch diameter, 1,200 ft. coils.

Price.....per lb.....

TRANSMISSION ROPE.

For transmission of power.

All sizes in stock, both three and four-strand.

We sell a special Manila Rope for power transmission purposes. This rope is made from the best selected Manila Hemp.

All Transmission Rope is made four strand and heart unless otherwise ordered, and the twist of the yarns and the lay of the rope made to correspond especially for the purpose intended. The yarns of this rope are each coated with a special composition, so that when twisted into strands the coating lodges in the hollows and uneven places among the fibres and thoroughly lubricates the strands and individual fibres composing the rope, which is thus made practically as near waterproof as possible.

Price.....per lb.....

MANILA ROPE.



Fig. D. 759.

Price List.

Quotations are made Basis Price, subject to the following differentials:

2 in. cir. $\frac{5}{8}$ in. dia. or larger.....Basis.

$1\frac{3}{4}$ in. cir. $\frac{7}{8}$ in. dia.....	$\frac{1}{2}$ c above Basis	$\frac{3}{4}$ in. cir. $\frac{1}{4}$ in. dia. 6 thread	$1\frac{1}{2}$ c above Basis
$1\frac{1}{2}$ in. cir. $\frac{1}{2}$ in. dia.....	$\frac{1}{2}$ c " "	$\frac{1}{2}$ in. cir. $\frac{1}{8}$ in. dia. 6 thread	" "
$1\frac{1}{4}$ in. cir. $\frac{7}{8}$ in. dia.....	$\frac{1}{2}$ c " "	fine.....	2c " "
$1\frac{1}{8}$ in. cir. $\frac{3}{8}$ in. dia. 12 thread.	1c " "	$\frac{3}{8}$ in. cir. $\frac{1}{8}$ in. dia. 6 thread	" "
1 in. cir. $\frac{1}{8}$ in. dia. 9 thread	$1\frac{1}{2}$ c " "	extra fine.....	$2\frac{1}{2}$ c " "

MANILA

Bolt Rope.....	3c above Basis
Yacht Bolt Rope.....	Special
Tallow Laid Rope.....	Basis
Plumbago Laid Rope.....	2c above "
Canal and Two Lines.....	"
Net Rope.....	"
Hawser Laid Fisherman's Cables, Tarred	"
Lobster Marline.....	Special
Drilling Cables, Sand, Tubing and	"
Sucker Rod Lines.....	"
Bull Ropes.....	"
Raft Rope, 6 and 9 thread....	1c above Basis
Transmission and Hoisting Rope.	"
Select Stock, Columbia Gra-	"
phite.....	4c above Basis
Select Stock, Columbia Tallow	"
Laid.....	4c " "
Lariat Rope	"
3 Strand Hard Laid.....	2c above Basis
4 Strand Hard Laid.....	$2\frac{1}{2}$ c " "
Yacht Lariat 3 or 4 Strand.....	Special
Hide, Hay, Bale Rope, Spun Yarn, Paper	"
Makers' Twine and Fish Twine.	"
Medium and Coarse.....	Basis
Fine.....	$\frac{1}{2}$ c above "
Extra Fine.....	1c " "
If uncoiled, 1c extra; if Laid, $\frac{1}{2}$ c extra.	

SISAL

Raft Rope.	"
6 and 9 Thread.....	1c above Basis
Lariat Rope.	"
3 Strand, Hard Laid.....	2c above Basis
4 Strand, Hard Laid.....	$2\frac{1}{2}$ c " "
Clothes Lines (all lengths).	"
3 Thread Laid (in coils).....	1c above Basis
6 Thread Fine (in coils).....	2c " "
3 Thread Laid Gross Packages.	2c " "
6 Thread Fine Gross Packages.	3c " "
Hide, Hay, Bale Rope, Spun Yarn, Paper	"
Makers' Twine and Fish Twine.	"
Medium and Coarse.....	Basis
Fine.....	$\frac{1}{2}$ c above "
Extra Fine.....	1c " "
If uncoiled, 1c extra; if Laid, $\frac{1}{2}$ c extra.	
Tarred Lath Yarn, Shingle Yarn, etc.	"
Medium and Coarse.....	$\frac{1}{2}$ c below Basis
Fine.....	"
Extra Fine.....	$\frac{1}{2}$ c above "
Tarred Fodder Yarn.	"
Medium and Coarse.....	1c below Basis
Fine.....	$\frac{1}{2}$ c " "
Extra Fine.....	"

When ordering Rope, please state if sizes refer to Diameter or Circumference.

All 4 Strand Rope, except Bolt and Transmission, 1c extra.

Balling, $\frac{1}{4}$ c extra. No tare allowed.

Correspondence solicited on Manila and Sisal Cordage not mentioned in this list.

PURE MANILA ROPE.

Approximate Weight and Strength.

Coils, 1,200 feet. Half Coils, 600 feet.

Cir.	Dia.	Weight and Length per Coil.	Length of Manila Rope in One Lb.	Strain Borne by New Manila Rope.
$\frac{1}{2}$ in.	$\frac{3}{16}$ in.	35 lbs. 2,100 ft.	60 ft.	550 lbs.
$\frac{3}{4}$ "	$\frac{1}{4}$ "	50 "	55 "	620 "
1 "	$\frac{5}{16}$ "	55 "	41 "	1,000 "
$1\frac{1}{8}$ "	$\frac{3}{8}$ "	60 "	27 "	1,275 "
$1\frac{1}{4}$ "	$\frac{1}{2}$ "	70 "	18 "	1,875 "
$1\frac{1}{2}$ "	$\frac{5}{8}$ "	90 "	13 "	2,400 "
$1\frac{3}{4}$ "	$\frac{3}{4}$ "	125 "	9 " 4 in.	3,300 "
2 "	$\frac{7}{8}$ "	160 "	7 " 6 "	4,000 "
$2\frac{1}{4}$ "	$\frac{1}{2}$ "	198 "	6 " 1 "	4,700 "
$2\frac{1}{2}$ "	$\frac{1}{2}$ "	234 "	5 " 1 "	5,600 "
$2\frac{3}{4}$ "	$\frac{1}{2}$ "	270 "	4 " 5 "	6,500 "
3 "	1 "	324 "	3 " 8 "	7,500 "
$3\frac{1}{4}$ "	$1\frac{1}{8}$ "	378 "	3 " 2 "	8,900 "
$3\frac{1}{2}$ "	$1\frac{1}{8}$ "	432 "	2 " 9 "	10,500 "
$3\frac{3}{4}$ "	$1\frac{1}{4}$ "	504 "	2 " 5 "	12,500 "
4 "	$1\frac{1}{4}$ "	576 "	2 " 1 "	14,000 "
$4\frac{1}{4}$ "	$1\frac{3}{8}$ "	648 "	1 " 10 "	15,400 "
$4\frac{1}{2}$ "	$1\frac{1}{2}$ "	720 "	1 " 8 "	17,000 "
$4\frac{3}{4}$ "	$1\frac{1}{2}$ "	810 "	1 " 6 "	18,400 "
5 "	$1\frac{5}{8}$ "	900 "	1 " 4 "	20,000 "
$5\frac{1}{2}$ "	$1\frac{3}{4}$ "	1,080 "	1 " 1 "	25,000 "
6 "	2 "	1,296 "	11 "	30,000 "
$6\frac{1}{2}$ "	$2\frac{1}{8}$ "	1,512 "	9 $\frac{1}{2}$ "	33,000 "
7 "	$2\frac{1}{4}$ "	1,764 "	8 "	37,000 "
$7\frac{1}{2}$ "	$2\frac{1}{2}$ "	2,016 "	7 "	43,000 "
8 "	$2\frac{3}{8}$ "	2,304 "	6 $\frac{1}{4}$ "	50,000 "
$8\frac{1}{2}$ "	$2\frac{1}{2}$ "	2,590 "	5 $\frac{1}{2}$ "	56,000 "
9 "	3 "	2,915 "	5 "	62,000 "
$9\frac{1}{2}$ "	$3\frac{1}{8}$ "	3,240 "	4 $\frac{1}{2}$ "	68,000 "
10 "	$3\frac{1}{4}$ "	3,600 "	4 "	75,000 "

INSIDE IRON STRAPPED BLOCKS.



Fig. D. 760.
Single, with Becket.



Fig. D. 761.
Double.



Fig. D. 762.
Triple.

DIMENSIONS.			COMMON IRON BUSHED.			IMPROVED ROLLER, BUSHED.		
Size Sheave.	For Dia. Rope.	Size Shell, inches.	Single, Each.	Double, Each.	Triple, Each.	Single, Each.	Double, Each.	Triple, Each.
1½ x 1½	¾	3	\$ 0 70	\$ 1 30	\$ 1 75	\$ 1 10	\$ 2 00	\$ 2 90
2 x 1½	¾	3½	75	1 45	2 00	1 15	2 20	3 15
2½ x 1½	¾	4	85	1 60	2 15	1 20	2 25	3 25
3 x 1½	¾	5	90	1 75	2 25	1 25	2 35	3 50
3½ x 1½	¾	6	1 10	2 00	2 90	1 50	2 85	4 40
4 x 1½	¾	7	1 30	2 40	3 50	1 70	3 35	5 00
4½ x 1½	1	8	1 65	2 85	4 25	2 25	4 15	6 00
5 x 1½	1	9	1 85	3 40	4 75	2 50	4 70	7 25
6 x 1½	1½	10	2 75	4 50	6 25	3 50	6 00	8 50
7 x 1½	1½	11	4 45	7 50	10 65	5 30	9 20	13 20
8 x 1½	1½	12	4 45	7 50	10 65	5 30	9 20	13 20
9 x 1½	1½	13	7 00	10 50	15 00	8 15	12 80	18 45
9½ x 1½	1½	14	7 00	10 50	15 00	8 15	12 80	18 45
10 x 1½	1½	15	8 00	13 00	18 00	9 25	15 50	21 75
11 x 1½	1½	16	10 00	15 00	22 00	11 50	18 00	26 50

Phosphor Bronze or Metaline Self-Lubricating Bushed.

Size Shell.	Single, Each.	Double, Each.	Triple, Each.	Size Shell.	Single, Each.	Double, Each.	Triple, Each.
4 inches. . .	\$1 50	\$2 90	\$ 4 15	10 inches. .	\$ 4 75	\$ 8 50	\$12 50
5 " . . .	1 75	3 35	4 75	11 " . . .	6 75	12 50	18 50
6 " . . .	2 20	4 00	5 80	12 " . . .	6 75	12 50	18 50
7 " . . .	2 50	4 50	6 70	13 " . . .	9 75	17 00	25 00
8 " . . .	3 25	5 70	8 50	14 " . . .	9 75	17 00	25 00
9 " . . .	3 70	6 75	10 00	15 " . . .	11 00	19 50	28 50

Discount.....

Lignum vitae Sheaves extra.

Beckets furnished on all the single, one-half the double, and one-third the triple, without charge.

When ordering specify if blocks are wanted with or without becket.

HEAVY TACKLE, THICK MORTISE BLOCK.

Extra Heavy Inside Straps and Hooks. Cheeks Edge Bolted.
Loose Hooks, Rings or Shackles. Iron Sheaves.



Fig. D. 763.



Fig. D. 764.



Fig. D. 765.

Single, with Becket. Double, with Becket.

Triple, no Becket.

DIMENSIONS.			COMMON IRON BUSHED.			IMPROVED ROLLER BUSHED.		
Size Sheave.	For Dia. Rope.	Size Shell, Inches.	Single, Each.	Double, Each.	Triple, Each.	Single, Each.	Double, Each.	Triple, Each.
4 1/2 x 1 1/2 x 1 1/2	1	7	\$ 2 25	\$ 4 00	\$ 5 50	\$ 3 00	\$ 5 50	\$ 7 75
4 1/2 x 1 1/2 x 1 1/2	1 1/4	8	2 75	4 50	6 30	3 50	6 00	8 55
5 1/2 x 1 1/2 x 1 1/2	1 1/4	9	3 15	5 25	7 25	4 00	6 95	9 80
6 1/2 x 1 1/2 x 1 1/2	1 1/2	10	4 00	6 50	8 50	5 25	9 00	12 25
7 x 1 1/2 x 1 1/2	1 1/2	11	5 25	8 50	12 50	6 50	11 00	16 25
8 x 1 1/2 x 1 1/2	1 1/2	12	5 25	8 50	12 50	6 50	11 00	16 25
9 x 1 1/2 x 1 1/2	1 1/2	13	8 00	13 00	17 00	9 75	16 50	22 25
9 1/2 x 1 1/2 x 1 1/2	1 1/2	14	8 00	13 00	17 00	9 75	16 50	22 25
10 x 1 1/2 x 1 1/2	1 1/2	15	9 00	15 00	20 00	11 00	19 00	26 00
11 x 2 1/2 x 1 1/2	2	16	11 50	18 00	28 00	14 00	23 00	35 50

Phosphor Bronze or Metaline Self-Lubricating Bushed.

Size Shell.	Single.	Double.	Triple.	Size Shell.	Single.	Double.	Triple.
8 inches.	\$5 00	\$ 9 00	\$13 00	13 inches. .	\$13 00	\$23 50	\$33 00
9 " " " " " " " "	5 75	10 50	15 00	14 " " " " " " " "	13 00	23 50	33 00
10 " " " " " " " "	7 25	13 50	19 00	15 " " " " " " " "	15 00	26 50	37 00
11 " " " " " " " "	9 25	17 00	25 00	16 " " " " " " " "	18 00	32 00	48 00
12 " " " " " " " "	9 25	17 00	33 00				

These Blocks are adapted for railroad, mining, bridge building, and contractors' work.

For Blocks with mortise wider than above, add 10 per cent. to list for every 1/4 inch.

When ordering specify size of shell and state if Becket is wanted.

Discount.....

EXTRA HEAVY IRON STRAPPED BLOCKS.

For Railroad Wrecking Cars and Steamboat Use.

(With Rings or Shackles.)



Fig. D. 766.

Lashing Shackle and Becket.

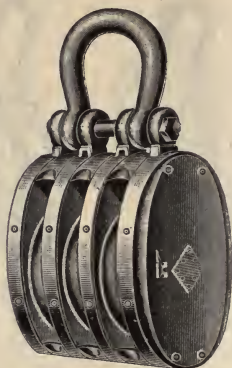


Fig. D. 767.

Lashing Shackle, no Becket.

Dimensions.			Common Iron Bushed.			Improved Roller, Bushed.		
Size Sheave.	For Dia. Rope.	Size Shell, Inches.	Single, Each.	Dble., Each.	Triple, Each.	Single, Each.	Dble, Each.	Triple, Each.
12x2 $\frac{1}{2}$ x1 $\frac{1}{2}$	2 $\frac{1}{2}$	18	\$15 00	\$29 00	\$42 00	\$18 00	\$35 00	\$52 00
14x2 $\frac{1}{2}$ x1 $\frac{1}{2}$	2 $\frac{1}{2}$	20	21 00	37 00	54 00	25 00	45 00	65 00
15x3 $\frac{1}{2}$ x1 $\frac{1}{2}$	3	22	26 00	48 00	70 00	35 00	65 00	95 00
16x3 $\frac{1}{2}$ x1 $\frac{1}{2}$	3 $\frac{1}{2}$	24	32 00	56 00	84 00	43 00	80 00	120 00

Phosphor-Bronze or Meteline Self-Lubricating Bushed.

Size Shell.	Single, Each.	Double, Each.	Triple, Each.
18 inches....."	\$23 00	\$44 00	\$ 63 00
20 "	32 00	54 00	77 00
22 "	38 00	70 00	100 00
24 "	46 00	85 00	125 00

Discount.....

Larger sizes furnished to order.

In ordering state whether with Rings or Lashing Shackles and if Becketts are wanted.

SNATCH BLOCKS.

Wood Shell.

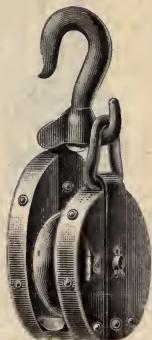


Fig. D. 768.

With Drop Link.



Fig. D. 769.

With Bail.

Size Sheave.	For Diameter Rope.	Size Shell, Inches.	Common Iron Bushed.	Improved Roller Bushed.	Phosphor Bronze or Metalline Bushed.
3 x1½ x 1½	7/8	6	\$ 4 00	\$ 4 65	\$ 5 25
3½ x1½ x 1½	1	7	4 75	5 50	6 00
4½ x1½ x 1½	1 1/8	8	5 75	6 60	7 25
5 x1½ x 1½	1 1/4	9	6 75	7 75	8 50
5½ x1½ x 1½	1 1/2	10	8 50	10 00	11 00
6½ x2½ x 2½	1 3/4	12	10 00	11 50	13 00
8 x2½ x 2½	2	14	13 00	15 00	16 50
9 x2½ x 2½	2 1/4	16	17 00	20 00	22 00
10 x3 x 3	2 1/2	18	25 00	28 50	31 00
11 x3½ x 3½	3	20	38 00	43 00	46 00
11½ x4½ x 4½	3 1/2	22	55 00	63 00	68 00
12½ x4½ x 4½	4	24	70 00	78 00	86 00
14 x4½ x 4½		26	90 00		110 00

Discount 16 in. and smaller.....

Discount 18 in. and larger.....

HEAVY STEEL TACKLE BLOCKS.

With Loose Hooks.

Fig. D. 770.
Single.Fig. D. 771.
Double.Fig. D. 772.
Triple.

DIMENSIONS.			IRON BUSHED.			IMPROVED ROLLER BUSHED.		
Dia. Sheaves, Inches.	For Dia. Rope, Inches.	Length Shell, Inches.	Single, each.	Double, each.	Triple, each.	Single, each.	Double, each.	Triple, each.
2½ x ½ x ½	½	4	\$ 0 85	\$ 1 60	\$ 2 15	\$ 1 20	\$ 2 25	\$ 3 25
3 x ¾ x ¾	¾	5	90	1 75	2 25	1 25	2 35	3 50
3½ x 1 x ¾	1	6	1 10	2 00	2 90	1 50	2 85	4 40
4½ x 1 x ¾	1	7	1 30	2 40	3 50	1 70	3 35	5 00
4½ x 1½ x ¾	1½	8	1 65	2 85	4 25	2 25	4 15	6 00
6½ x 1½ x ¾	1½	10	3 10	5 10	7 00	4 05	7 00	9 85
8	1½	12	5 00	8 25	11 75	6 00	10 35	14 90
9½	1½	14	7 50	11 75	16 50	8 75	14 25	20 25
11	2	16	13 00	21 00	32 00	14 00	24 00	35 00
12	2½	18	22 00	35 00	50 00	.....	.....	.....
14	2½	20	30 00	50 00	65 00	.....	.....	.....

Discount to 8 inch.....

Discount 10 inch and larger.....

Phosphor-Bronze or Metaline Self-Lubricating Bushed.

Size Shell.	Single, each.	Double, each.	Triple, each.	Size Shell.	Single, each.	Double, each.	Triple each.
4 inches. ..	\$1 50	\$2 90	\$4 15	9 inches..	\$ 3 55	\$ 6 30	\$ 9 00
5 " ..	1 75	3 35	4 75	10 " ..	4 40	7 70	11 00
6 " ..	2 20	4 00	5 80	12 " ..	6 45	11 15	16 00
7 " ..	2 50	4 50	6 70	14 " ..	9 10	15 00	21 30
8 " ..	3 25	5 70	8 50	16 " ..	15 00	25 00	38 00

Discount to 8 inch

Discount 9 inch and larger.....

STEEL TACKLE BLOCKS.

Heavy, With Shackles.



Fig. D. 773.



Fig. D. 774.

DIMENSIONS			IRON BUSHED.		
Size Sheave, Inches.	For Dia. Rope, Inches.	Length Shell, Inches.	Single, each.	Double, each.	Triple, each.
4½x1½x ¾	1	8	\$ 2 75	\$ 4 50	\$ 6 30
5½x1½x ¾	1½	9	3 15	5 25	7 25
6½x1½x ¾	1½	10	4 00	6 50	8 50
8 x1½x ¾	1½	12	6 25	10 25	15 00
9½x1½x ¾	1½	14	9 00	15 00	20 00
11 x2½x1	2	16	13 00	21 00	32 00
12 x2½x1½	2½	18	20 00	35 00	50 00
13½x2½x1½	2½	20	28 00	45 00	65 00
14½x3½x1½	3	22	Prices quoted upon application. Name size block and weight of load.		
15½x3½x1½	3½	24			
17 x4½x1½	4	24			

DIMENSIONS			Phosphor Bronze or Metaline Bushed, Self-Lubricating.		
Size Sheave, Inches.	For Dia. Rope, Inches.	Length Shell, Inches.	Single, each.	Double, each.	Triple, each.
4½x1½x ¾	1	8	\$ 3 85	\$ 6 70	\$ 9 60
5½x1½x ¾	1½	9	4 40	7 75	11 00
6½x1½x ¾	1½	10	5 50	9 50	13 00
8 x1½x ¾	1½	12	7 85	13 50	20 00
9½x1½x ¾	1½	14	11 00	19 00	26 00
11 x2½x1	2	16	15 50	26 00	39 50
12 x2½x1½	2½	18	23 00	41 00	59 00
13½x2½x1½	2½	20	32 00	53 00	77 00
14½x3½x1½	3	22	Prices quoted upon application. Name size block and weight of load.		
15½x3½x1½	3½	24			
17 x4½x1½	4	24			

Above blocks fitted with rings instead of shackles, when so preferred.

Discount.....

WROUGHT IRON BLOCKS.

With Extra Heavy Flatted Hooks or Shackles.



Fig. D. 775.



Fig. D. 776.



Fig. D. 777.

Dimensions.			Improved Five Roller Bushed.			Phosphor Bronze or Metaline Bushed, Self Lubricating.		
Size Sheave, inches.	For Dia. Rope, inches.	Length Shell, inches.	Single, each.	Double, each.	Triple, each.	Single, each.	Double, each.	Triple, each.
3½ x 1	¾	6	\$ 2 20	\$ 3 75	\$ 5 50	\$ 2 85	\$ 5 00	\$ 7 25
4¼ x 1	7⁄8	7	2 40	4 50	6 30	3 15	6 00	8 40
4½ x 1½	1	8	3 00	5 40	8 00	3 80	7 50	10 50
5½ x 1½	1½	9	3 40	6 40	9 00	4 20	8 50	11 50
6¼ x 1½	1¼	10	4 80	8 10	11 00	5 80	10 50	14 00
8 x 1	1½	12	7 25	12 70	19 00	9 00	16 40	23 50
9½ x 1	1¾	14	10 25	19 50	27 00	12 50	22 50	30 50
10½ x 2	2	16	19 00	35 00	50 00	23 50	44 00	65 00
12 x 3	2½	18	27 00	51 00	71 00	32 00	61 00	86 00

Discount.....

The sides and middles of shell are rounded to prevent chafing rope.
All straps extend full length of block.

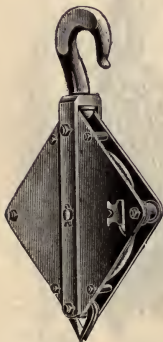
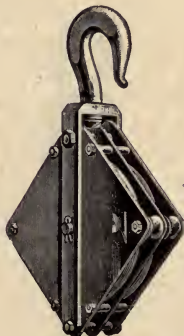
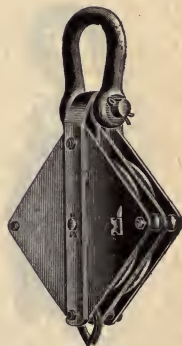
Above blocks fitted with Stiff Swivel Hooks. Price on application.

These blocks are adapted for railroads, mining, bridge building and contractors' work.

For list on quadruple blocks, add the lists for single and triple together.

WIRE ROPE BLOCKS.

Wrought Iron.

Fig. D. 778.
Swivel Hooks.Fig. D. 779.
Swivel Hooks.Fig. D. 780.
With Shackle.

DIMENSIONS.		IRON BUSHED.			Phosphor Bronze or Metaline Self-Lubricating Bushed.		
Dia. Sheave Inches.	For Dia. Rope, Inches.	Single, Each.	Double Each.	Triple, Each.	Single, Each.	Double, Each.	Triple, Each.
6	1/4"	\$ 6 00	\$11 00	\$14 00	\$ 9 00	\$17 00	\$22 00
8		8 00	13 00	16 00	11 00	19 00	24 00
10		10 00	15 00	20 00	13 00	21 00	28 00
12		12 00	17 00	23 00	15 00	23 00	31 00
14		14 00	19 00	26 00	17 00	25 00	34 00
16		16 00	22 00	30 00	19 50	29 00	40 00

Other sizes furnished to order.

Discount.....

WIRE ROPE BLOCKS.

Wrought Iron.

EXTRA HEAVY.



Fig. D. 781

Stiff Swivel Hook.



Fig. D. 782.

Extra Heavy Shackle.

DIMENSIONS.		IRON BUSHED.			Phosphor Bronze or Metalline Self-Lubricating Bushed.		
Dia. Sheave, Inches.	For Dia. Rope, Inches.	Single, Each.	Double, Each.	Triple, Each.	Single, Each.	Double, Each.	Triple, Each.
10	1	\$14 00	\$20 00	\$28 00	\$17 00	\$26 00	\$37 00
12		16 00	23 00	31 00	19 00	29 00	41 00
14		18 00	25 00	36 00	21 00	31 00	45 00
16		31 00	40 00	46 00	36 00	50 00	62 00
18		34 50	45 00	60 00	40 00	56 00	75 00

The center straps in double and triple blocks extend full length of shell furnishing proper support for center pin in middle of the block.
Other sizes furnished to order.

Discount.....

PRODUCERS' IRON SHELL SNATCH BLOCKS.

Heavy Pattern.

For Manila or Wire Rope.



Fig. D. 783.



Fig. D. 784.



Fig. D. 785.

Self-Oiling Sheaves.

Shell, inches.	Dia. Sheave, inches.	Diam. Rope.		Single.		Double.		Triple.	
		Manila.	Wire.	Weight. Lbs.	Each.	Weight. Lbs.	Each.	Weight. Lbs.	Each.
20	12	2½	1	115	\$16 50	161	\$26 00	210	\$35 00
22	14	2½	1	135	22 00	200	30 00	280	44 00
24	15½	2½	1	170	25 50	260	37 00	350	52 00
26	16½	2½	1½	195	28 00	290	42 00	390	58 00
28	18½	2½	1½	220	34 00	340	48 00	450	62 00
30	22	2½	1½	260	40 00	400	60 00	570	76 00

In ordering, state whether blocks are to carry Manila or Wire Rope.

Discount

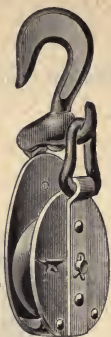


Fig. D. 786.

Steel Shell for Manila.



Fig. D. 787.

Wrought Iron for Wire Rope.

For Manila Rope.

Size Sheave.	For Diameter Rope.	Length Shell, Inches.	Iron Bushed.	Improved Roller Bushed.	Phosphor Bronze or Met- aline Bushed.
3 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{7}{8}$	6	\$ 5 00	\$ 5 40	\$ 5 50
3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{7}{8}$	7	5 50	6 00	6 50
4 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{7}{8}$	8	7 00	7 20	7 65
5 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{8}$	9	8 00	8 50	9 00
5 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{8}$	10	9 00	10 00	10 50
6 $\frac{1}{2}$ x 2 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{2}$	12	11 50	12 50	13 00
8 x 2 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{2}$	14	15 00	16 00	16 25
9 x 2 $\frac{1}{2}$ x 1	2	16	20 00	21 00	21 75
10 x 3 x 1	2 $\frac{1}{2}$	18	25 00	27 00	28 00
11 x 3 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2 $\frac{1}{2}$	20	36 00	38 00	39 50
11 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3	22	52 00	58 00	60 50
12 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	3 $\frac{1}{2}$	24	72 00	80 00	85 00
14 x 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	4	26	90 00	.....	110 00

Discount.....

For Wire Rope.

Diameter Sheave, Inches	For Diameter Rope, Inches.	Iron Bushed, each,	Phosphor Bronze or Metaline Bushed, Self-Lubricating each.
10	$\frac{1}{2}$	\$16 00	\$18 00
12	$\frac{3}{4}$	18 00	21 00
14	$\frac{1}{2}$	20 00	23 00
16	$\frac{3}{4}$	28 00	33 00
18	1	38 00	44 00
20	1 $\frac{1}{2}$	50 00	58 00

Discount.....

Figure No. D. 787 has center extension piece coming close to the sheave, preventing the wire rope from leaving the sheave.

IMPROVED METAL SNATCH BLOCKS.

Fig. D. 788.
Closed.Fig. D. 789.
Open.

This block has the safest and most easily operated locking device of any on the market.

Size Sheave inches.	For Diam. Rope inches	Length Shell, inches.	Self Lubricat- ing Iron Bushed, each.	Improved Roller Bushed, each.	Phosphor Bronze or Metalline Bushed, each
3 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{7}{8}$	6	\$ 4 50	\$ 5 15	\$ 5 75
3 $\frac{1}{2}$ x 1 $\frac{1}{4}$ x $\frac{1}{2}$	$\frac{7}{8}$	7	5 50	6 25	6 75
4 $\frac{1}{2}$ x 1 $\frac{1}{4}$ x $\frac{1}{2}$	1	8	6 50	7 35	8 00
5 $\frac{1}{2}$ x 1 $\frac{1}{4}$ x $\frac{1}{2}$	1 $\frac{1}{4}$	10	10 00	11 50	12 50
6 $\frac{1}{2}$ x 2 $\frac{1}{4}$ x $\frac{1}{2}$	1 $\frac{1}{2}$	12	12 50	14 00	15 50
8 x 2 $\frac{1}{4}$ x $\frac{1}{2}$	1 $\frac{3}{4}$	14	16 00	18 00	19 50
9 x 2 $\frac{3}{4}$ x 1	2	16	21 00	24 00	26 00

Discount.....

RAILROAD BALLAST SNATCH BLOCKS.

Steel shell, 16 inches long.

Sheave 9 inches diameter with chilled groove for 1 $\frac{1}{2}$ inch diameter wire rope.

Center pin 1 $\frac{1}{2}$ inches fastened with hex nut and cotter key.

Phosphor bronze, self lubricating bushed.

Prices on application.



Fig. D. 790

STEEL TACKLE BLOCKS.

Hartz Regular Mortise.

Fig. D. 791.
Single.Fig. D. 792.
Double.Fig. D. 793.
Triple.

Furnished with Safety Link Hook.

Dimensions.		Plain Bushing.			Steel Roller Bushing.		
Length of Shell.	Diameter of Rope.	Single.	Dble.	Triple.	Single.	Dble.	Triple.
4 inches.....	$\frac{1}{2}$ inch.	\$0 85	\$ 1 60	\$ 2 15	\$ 1 20	\$ 2 25	\$ 3 25
5 ".....	$\frac{3}{4}$ "	90	1 75	2 25	1 25	2 35	3 50
6 ".....	$\frac{7}{8}$ "	1 10	2 00	2 90	1 50	2 85	4 40
7 ".....	1 "	1 30	2 40	3 50	1 70	3 35	5 00
8 ".....	1 $\frac{1}{8}$ "	1 65	2 85	4 25	2 25	4 15	6 00
9 ".....	1 $\frac{1}{4}$ "	1 85	3 40	4 75	2 50	4 70	7 25
10 ".....	1 $\frac{3}{8}$ "	2 75	4 50	6 25	3 50	6 00	8 50
12 ".....	1 $\frac{5}{8}$ "	4 45	7 50	10 65	5 30	9 20	13 20
14 ".....	1 $\frac{3}{4}$ "	7 00	10 50	15 00	8 15	12 80	18 45

Self-Lubricating Graphite Bronze Bushing.

Size Shell.	Single.	Dble.	Triple.	Size Shell.	Single.	Dble.	Triple.
4 inches.....	\$1 50	\$2 90	\$4 10	9 inches....	\$3 10	\$ 5 90	\$ 8 50
5 ".....	1 65	3 25	4 50	10 ".....	4 15	7 30	10 45
6 ".....	1 95	3 70	5 45	12 ".....	6 05	10 70	15 45
7 ".....	2 25	4 30	6 35	14 ".....	8 85	14 20	20 55
8 ".....	2 75	5 05	7 55				

Discount.....



Fig. D. 794.
Derrick and
Hoisting Block.

STEEL TACKLE BLOCKS.

Hartz Wire Rope Derrick and Hoisting Block.

Used especially in derricks, quarries, elevators, bridge building, hoisting machinery, etc., etc.

In ordering these Blocks, always specify Wire Rope Derrick Blocks, to avoid mistakes.

Graphite Bronze Bushings—Self Lubricating.

Length of Shell.	Diameter of Rope.	Single.	Double.	Triple.
12 inches.	and $\frac{1}{2}$ in.	\$ 6 50	\$12 00	\$18 00
13 inches.	and $\frac{3}{4}$ in.	8 00	15 00	22 00
16 inches.	and 1 in.	10 00	19 00	27 00
18 inches.	and 1 in.	15 00	24 00	36 00

Discount



Fig. D. 795.

NEW STYLE CARGO HOISTING BLOCK.

For Stevedore Use.

New style cargo hoisting block, with wooden cheeks, malleable iron frame (galvanized), wrought iron hook and strap.

New style metal sheave, with lignum vitae projecting cheeks, and galvanized polished scores.



Fig. D. 796.

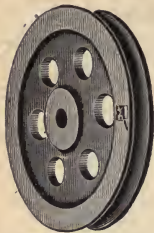
Phosphor Bronze or Metaline Bushed, Self Lubricating.

Size Sheave, inches.	For Diam. Rope, inches.	Size Block, inches	Price, each.
5 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{1}{2}$	6 $\frac{1}{2}$	\$ 5 00
5 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1	7 $\frac{1}{2}$	6 00
6 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{4}$	8 $\frac{1}{2}$	8 00
7 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{2}$	10	10 50
9 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{3}{4}$	11 $\frac{1}{2}$	13 00
10 x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{1}{2}$	12 $\frac{1}{2}$	16 00
11 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{1}{2}$	1 $\frac{3}{4}$	14	20 00
13 $\frac{1}{2}$ x 2 x 1	1 $\frac{3}{4}$	16 $\frac{1}{2}$	26 00

Discount

SHEAVES FOR WIRE ROPE.

Deep Grooves.

Fig. D. 797.
Iron Bushed.Fig. D. 798.
Bronze Bushed.

DIMENSIONS.			PRICES.	
Size of Sheave, Inches.	Thickness at Hub, Inches.	For Diameter Wire. Inches.	Iron Bushed, Each.	Phosphor Bronze or Metalline Bushed, Each.
4 x 1/2 x 1/2	1 1/8	3/8	\$ 0 30	\$ 1 15
6 x 1 x 1	1 1/4	1/2	65	1 75
6 x 1 1/2 x 1 1/2	1 1/2	5/8	75	2 00
6 x 1 1/2 x 1 1/2	1 5/8	3/4	1 00	2 50
7 x 1 1/2 x 1 1/2	1 3/4	7/8	1 20	2 50
8 x 1 1/2 x 1 1/2	1 7/8	1	1 25	2 65
8 x 1 1/2 x 1 1/2	2	1 1/8	1 50	3 00
10 x 1 1/2 x 1 1/2	2 1/8	1 1/4	2 25	4 00
10 x 1 1/2 x 1 1/2	2 1/4	1 1/2	2 25	4 40
10 x 1 1/2 x 1 1/2	2 1/2	1 3/4	2 70	4 60
12 x 1 1/2 x 1 1/2	2 3/4	2	2 50	4 25
12 x 1 1/2 x 1 1/2	2 7/8	and 2 1/8	3 20	5 25
12 x 1 1/2 x 1 1/2	3	and 2 1/4	3 60	5 80
12 x 1 1/2 x 1 1/2	3 1/8	and 2 1/2	3 60	5 95
14 x 1 1/2 x 1 1/2	3 1/4	and 2 3/4	4 40	6 50
14 x 1 1/2 x 1 1/2	3 1/2	and 3	4 40	6 75
14 x 1 1/2 x 1 1/2	3 3/4	and 3 1/4	4 45	7 00
14 x 1 1/2 x 1 1/2	2	and 3 1/2	4 85	7 00
14 x 1 1/2 x 1 1/2	2 1/8	and 3 3/4	4 90	7 50
16 x 1 1/2 x 1 1/2	2 1/4	and 4	6 00	8 75
16 x 1 1/2 x 1 1/2	2 1/2	and 4 1/8	7 00	10 00
16 x 1 1/2 x 1 1/2	2 3/4	and 4 1/4	7 10	10 50
18 x 1 1/2 x 1 1/2	2 7/8	and 4 1/2	9 50	12 50
18 x 2 x 1 1/2	3 1/4	1	10 50	13 50
18 x 2 x 1 1/2	3 1/2	1	10 50	14 00
20 x 1 1/2 x 1 1/2	2	and 4 3/4	12 00	16 00
20 x 2 x 1 1/2	2 1/4	1 1/4	12 50	16 50

Discount.....

Special sizes furnished to order. We have many patterns not included in this list.

CHAIN HOISTS.

Efficiency of Chain Blocks.

The most important element in a hoisting machine is safety; the next, its speed and ease of lifting. In other words, its "mechanical efficiency," which means the percentage of the applied power given back in useful work. Chain Blocks vary greatly in "efficiency" because, as commonly made, friction is relied on to make them self-sustaining in a manner which causes wasteful resistance in hoisting. Excluding the Triplex and Duplex Blocks, the efficiency of the best Chain Blocks is less than 33 per cent, all the remainder of the work done at the hand chain being wasted in internal friction.

The Triplex Block, with its independent and automatic sustaining device attains an efficiency of over 79 per cent, and thus effects a remarkable saving both for hoisting and lowering, the labor required being reduced more than one half. Because of this the Triplex Block has had unparalleled success and is rapidly displacing the older types of Blocks wherever quick work is wanted and economy in time and labor is sought.

The Duplex Block with its improved worm gearing and solid steel trunnion attains an efficiency of 40 per cent, which is one-quarter more than obtained by any previous design of Screw Hoist. It is the only double-chain Screw Hoist in which the load sheaves are carried on a solid steel shaft and not on a cast iron sleeve, and which has safety guides to prevent the load chains from slipping. It is remarkably compact and portable, and in speed and power stands next to the Triplex

The Weston Differential Block (as furnished by the original makers), has an "efficiency" equal within one point to that of Screw Hoists of the common types. It requires more power, but it lifts at a higher speed, and the accurate fit of chains and sheaves insures unusual durability. It is the simplest and least expensive of all Chain Blocks, and should be used where the higher speed and power of the Triplex and Duplex Blocks are not desired.

Which Block to Use.

The Triplex Block lifts twice as fast as the Duplex and three times as easy as the Differential. The Triplex Block lifts a ton one foot with a pull on the hand chain of 87 pounds and the overhauling of 30 feet of hand chain.

The Duplex Block requires the overhauling of 59 feet of hand chain for the same work with the same pull on the hand chain.

The Triplex Block lifts a ton one foot with a one foot run of load chain.

The Differential Block lifts a ton one foot with a 30 foot run of load chain, and therefore, for the same amount of work, causes 30 times as much wear on the load chain and sheave. The Differential Block is all right where lifting is infrequent, the loads light and labor plenty.

The Duplex Block weighs less and takes less headroom than other types—it is well suited for erecting machinery or any work where lightness and compactness are required but where speed is not important.

The Triplex Block is the simplest, strongest, smoothest running, longest-wearing lifting device ever built and where a man has a fair amount of lifting to do, he cannot afford to buy any other block.

Prices and capacities on following pages.

CHAIN HOISTS.

Speeds of Hoisting.

Feet per minute attainable and number of men required for hoisting full loads without pulling over 80 pounds.

Tons.	Triplex Blocks.				Duplex Blocks.		Differential Blocks.	
	Full Load.	Half Load.	Qua't'r Load.	No. of Men.	Full load.	†No. of Men.	Full Load	†No. of Men.
$\frac{1}{4}$	8	16	24	1	4	1	6	1
$\frac{1}{2}$	4	8	12	1	2	1	6	2
1	4.8	9.6	14.4	2	2.40	2	3.70	3
1½	3.6	7.2	10.8	2	1.80	2	2.50	3
2	2.3	4.6	6.9	2	1.10	2	2.30	4
3	1.7	3.5	5.2	2	.80	2	2.30	7
4	1.3	2.6	3.9	2	.65	2	.....	.....
5	1.1	2.2	3.3	2	.50	2	.....	.....
6	.8	1.6	2.4	2	.35	2	.....	.....
8	.6	1.2	1.8	2	.30	2	.....	.....
10	1.1	2.2	3.3	4	.....	.....	.....	.....
12	.8	1.6	2.4	4	.....	.....	.....	.....
16	.6	1.2	1.8	4	.....	.....	.....	.....
20	.....	.....	.....	.....	.....	.....	.....	.....

†The number of men is based on each man pulling not over 80 pounds. One man pulling 160 pounds or less, as given in the first two columns, can lift the full capacity of any Triplex or Duplex Block.

Capacity in Tons.	Weight in Pounds One Man can Hoist at 80 lbs. Hand Chain Pull.			Hand Chain Pull in Pounds to Lift Full Load.			Feet of Hand Chain to be Operated to Lift One Foot.		
	Triplex	Duplex	Differential.	Triplex	Duplex	Differential.	Triplex	Duplex	Differential.
$\frac{1}{4}$	.....	.....	500	.....	.....	72	.....	.....	18
$\frac{1}{2}$	1000	1000	600	62	68	122	21	40	24
1	2000	1700	800	82	87	216	31	59	30
1½	2300	2500	1000	110	94	246	35	80	36
2	2600	2700	1100	120	115	308	42	93	42
3	4000	3300	1000	114	132	557	69	126	38
4	5000	4600	.....	124	142	.....	84	155	.....
5	6500	5300	.....	110	145	.....	126	195	.....
6	7000	6500	.....	130	145	.....	126	252	.....
8	9000	7800	.....	135	160	.....	168	310	.....
10	11000	10000	.....	140	160	.....	210	390	.....
12	13000	.....	.....	130*	.....	.....	126*	.....	.....
16	17000	.....	.....	135*	.....	.....	168*	.....	.....
20	20000	.....	.....	140*	.....	.....	210*	.....	.....

*On each of the two hand chains.

The speed of a chain block is governed by the pull required on the hand chain and the distance the hand chain must travel to lift the load the required distance.

The above speeds are given for short lifts with men accustomed to the work; for continuous easy lifting two-thirds of these speeds are attainable. The Triplex Block lifts rapidly, and the speed increases for light loads because the length of hand chain to be overhauled is small. This fact also enables the operator to lower the load very quickly with the Triplex Block. The 12 to 20 ton Triplex Blocks are provided with two separate hand wheels, thus permitting two men to hoist simultaneously, thereby securing double speed.

WESTON'S "DIRECT" DIFFERENTIAL PULLEY BLOCKS.

One man can lift 1,000 lbs.

They hold the load at any point and cannot run down.

Lifting and lowering effected by pulling opposite sides of the slack chain.

Every block tested to a 50% overload beyond its rated capacity before shipping.

Price List.

Capacity in Tons.	Price Com- plete.	*Hoist in Feet.	\$Extra Hoist. Price per Ft.	Net Wt. in Lbs.	Chain Pull.	
					†Lbs.	‡Feet.
$\frac{1}{8}$	\$18 00	5	\$2 80	11	.....	.....
$\frac{1}{4}$	18 00	6	2 80	22	72	18
$\frac{3}{8}$	21 00	7	2 80	30	122	24
1.....	28 00	8	3 00	51	216	30
$1\frac{1}{2}$	36 00	$8\frac{1}{2}$	3 20	81	246	36
2.....	45 00	9	3 40	122	308	42
3.....	60 00	$9\frac{1}{2}$	4 00	180	557	38

Discount.....

*Figures denote height in feet which blocks, with regular lengths of chain, will hoist above level on which operator stands.

‡Each additional foot of hoist requires 4 feet of additional chain.

†Pull in pounds required to lift the full load.

‡Number of feet of chain which must be handled to lift the load one foot.

Extra Length of Chains.

Allow about 4 feet of chain for each foot of extra hoist.

Fig. D. 799.

Price List of Parts.

List No.	Name of Parts.	CAPACITY IN TONS.						
		$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	1	$1\frac{1}{2}$	2	3
11	Top Yoke and Hook.....	\$3 00	\$3 00	\$3 75	\$4 50	\$5 50	\$7 50	11 00
12	Top Sheave.....	3 60	3 60	4 80	6 00	8 40	12 00	15 60
13	Bottom Sheave.....	90	90	1 30	1 50	1 90	2 25	3 75
14	Bottom Yoke and Hook..	2 25	2 25	3 00	3 75	4 50	5 50	8 00
15	Top Sheave Pin.....	40	40	50	50	60	60	70
16	Bottom Sheave Pin.....	30	30	40	40	50	50	60
	Regular Chain.....	10 50	10 50	12 50	17 00	21 50	27 00	36 00

Discount.....

CHAIN HOISTS.

The Triplex.



Fig. D. 800.
Style $\frac{1}{2}$ to 2 Tons.



Fig. D. 801.
Style 12 to 20 Tons.

Description and Prices on page 396.

CHAIN HOISTS.

The Triplex.

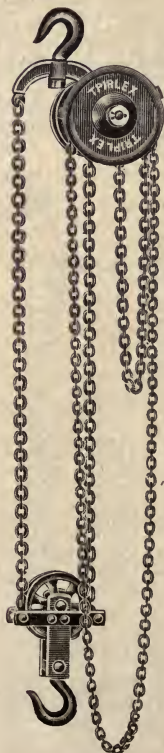


Fig. D. 802
Style 3 and 4 Tons.

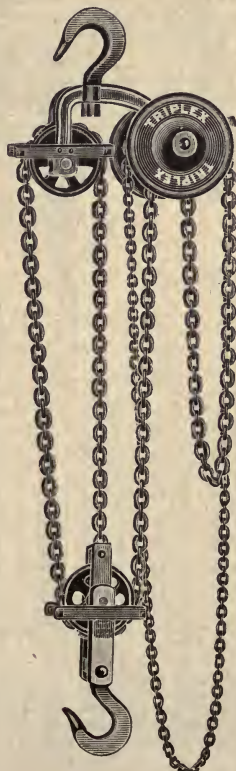


Fig. D. 803.
Style 5 to 10 Tons.

Description and Prices on page 396.

CHAIN HOISTS.

The Yale Triplex Block, Spur Geared, Patented, for Constant Use and Best Economy.

The great saving of time and labor effected by the Triplex Block is accomplished by separating the sustaining mechanism from the hoisting gear, so that the operator is not wasting the larger part of his effort in overcoming friction.

The Hoisting Mechanism consists of a direct train of spur gears from the small pinion on the central shaft to the internal gear wheel cast within the main frame. The two intermediate gears between the pinion and the internal gear are carried on the circular frame or cage, and roll around within the internal gear, thus forming a sun and planet motion giving the desired leverage.

The great advantages of the double arrangement of intermediate gears are balanced journal pressures, increased wearing surface, subdivision of strains, and an accurate equalizing of the load, resulting in diminished friction and wear. The frame carrying these intermediate gears is keyed fast to the hub of the hoisting chain sheave, and the central pinion shaft is driven by the hand chain wheel, so that the power is transmitted from the hand chain to the load chain through a direct spur-gear train of high efficiency.

The Triplex Block.

"From Hook to Hook a Line of Steel."

Capacity in Tons.	Price Complete.	Regular Hoist in Feet.	Reach in Feet and Inches.	Extra Hoist, Price per Foot.	Minimum Distance between Hooks in Inches.	Net Weight in Lbs.	Chain Pull in Lbs. to lift Full Load.	Feet of Chain Handled to lift Load one Foot.
$\frac{1}{4}$	\$ 35 00	8	9' 3"	\$0 90	15	53	62	21
1	45 00	8	9' 5"	95	17	80	82	31
$1\frac{1}{4}$	60 00	8	9' 7 $\frac{1}{2}$ "	1 00	19 $\frac{1}{2}$	124	110	35
2	70 00	9	11' 0"	1 05	24	188	120	42
3	90 00	10	12' 8"	1 50	32	200	114	69
4	110 00	10	13' 1"	1 60	37	233	124	84
5	140 00	12	15' 9"	2 15	45	380	110	126
6	165 00	12	15' 10"	2 15	46	390	130	126
8	200 00	12	16' 3"	2 70	51	455	135	168
10	240 00	12	16' 9"	3 25	57	570	140	210
12	300 00	12	16' 9"	4 30	57	795	†130	†126
16	360 00	12	17' 1"	5 40	61	967	†135	†168
20	425 00	12	18' 5"	6 50	77	1375	†140	†210
32 40	} Prices and full particulars upon request.							

†For each hand chain.

A High-speed Triplex Block, specially geared, is made in two sizes ($\frac{1}{4}$ Ton at \$35.00 and $\frac{1}{2}$ Ton at \$45.00), suitable for rapid work in frequent lifting of loads weighing less than five hundred pounds. They handle light loads at double speed, but require double the chain pull.

Discount.....

Explanation of reference marks on page 397.

§In ordering Load Chain specify whether or not hook is required.

†Parts 218 and 127 should be specified "Quick Speed" for blocks so marked on the gear cover. Parts 129 and 221 are a driven fit. In putting together see that the gauging holes in No. 127 line up at the center.

PRICES FOR PARTS OF TRIPLEX BLOCKS, 1898 MODEL.

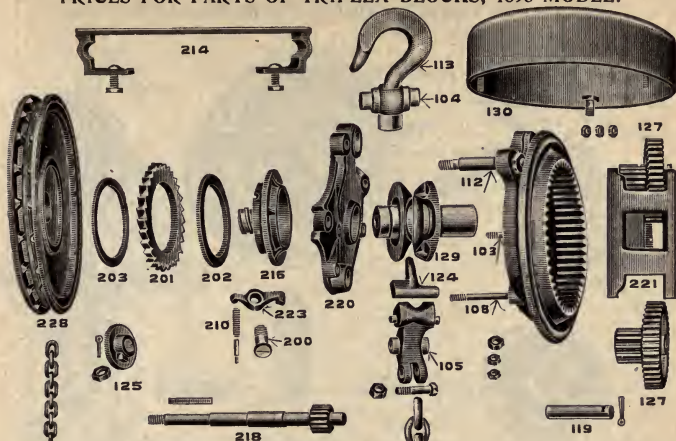


Fig. D 804.

List No.	NAME.	$\frac{1}{2}$ Ton.	1 Ton.	1 $\frac{1}{2}$ Tons.	2 Tons.	3 Tons.	4 to 20 Tons.
103	Small separators.....	40	50	60	70	60	70
104	Top cross head.....	1 00	1 40	2 00	2 40	.....	.....
105	Load chain guide.....	30	30	40	50	40	50
108	Load chain guide bolt..	20	20	30	40	30	40
112	Large separator.....	60	70	80	1 00	80	1 00
113	Top hook.....	1 00	1 40	1 80	2 00	.....	.....
119	Gear and pinion pins, ea.	40	60	70	80	70	80
124	Stripper.....	30	40	50	50	50	50
125	Check washer.....	40	50	70	90	70	90
126	Internal gear.....	2 40	3 20	5 00	6 00	5 00	6 00
127	Gear and pinions, each.	80 $\frac{1}{2}$	1 10 $\frac{1}{2}$	1 40 $\frac{1}{2}$	1 60 $\frac{1}{2}$	1 40 $\frac{1}{2}$	1 60 $\frac{1}{2}$
129	Load sheave.....	2 00	3 20	4 75	6 35	4 75	6 35
130	Gear cover.....	1 20	1 50	1 80	2 10	1 80	2 10
131	Lower swivel hook.....	1 50	2 30	3 20	5 50	.....	.....
200	Pawl stud.....	40	40	50	50	50	50
201	Ratchet disc.....	80	1 00	1 40	1 50	1 40	1 50
202	Leather disc.....	40	40	50	60	50	60
203	Galvanized iron disc....	40	40	50	60	50	60
210	Pawl spring.....	20	20	30	30	30	30
214	Strap hand chain guide.	75	1 20	1 50	1 80	1 50	1 80
216	Disc hub.....	1 80	2 30	3 20	4 20	3 20	4 20
218	Driving pinion.....	3 00 $\frac{1}{2}$	4 00 $\frac{1}{2}$	5 00 $\frac{1}{2}$	6 00 $\frac{1}{2}$	5 00 $\frac{1}{2}$	6 00 $\frac{1}{2}$
220	Ratchet case.....	2 50	3 50	4 50	5 50	4 50	5 50
221	Pinion cage.....	1 60	2 10	3 20	4 20	3 20	4 20
222	Pawl.....	20	20	30	30	30	30
228	Hand wheel.....	1 80	2 30	3 00	3 60	3 00	3 60
	Load chain, per foot....	40 $\frac{1}{2}$	45 $\frac{1}{2}$	50 $\frac{1}{2}$	55 $\frac{1}{2}$	50 $\frac{1}{2}$	55 $\frac{1}{2}$
	Hand chain, steel, per ft.	25	25	25	25	25	25

See also next page.

For explanation of reference marks, see page 396.

Discount.....

PRICES FOR PARTS OF TRIPLEX BLOCKS, 3 TO 10 TONS.

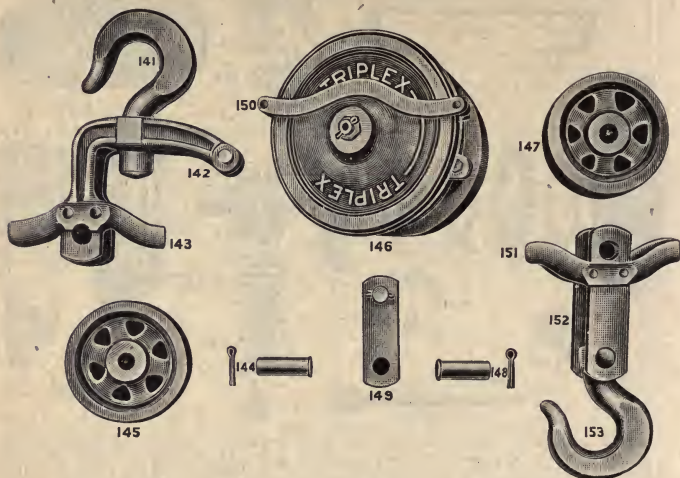


Fig. D. 805.

List No.	NAME.	3 Tons.	4 Tons.	5 Tons.	6 Tons.	8 Tons.	10 Tons
Top Block.							
141	Top Hook.....	\$ 3 00	\$ 5 00	\$ 6 00	\$ 7 00	\$12 00	\$15 00
142	Top Yoke.....	6 35	14 30	16 60	25 00	35 00	40 00
143	Top Guard and Guides.....	.....	.....	4 80	7 00	12 00	14 00
144	Top Sheave Pin.....	.....	.....	1 00	1 50	2 00	2 50
145	Top Sheaves.....	.....	.....	3 00	4 50	5 00	5 50
Main Block.							
146	Main Block, A or B..	\$47 50	\$55 00	\$55 00	\$55 00	\$55 00	\$55 00
150	Top Yoke and Crosshead for Main Block, Type B....	3 80	4 40	4 40	4 40	4 40	4 40
Bottom Block.							
147	Bottom Sheave.....	\$ 3 00	\$ 4 50	\$4 50	\$ 6 00	\$ 6 00	\$ 7 00
148	Bottom Sheave Pin...	80	1 30	1 50	2 00	2 50	3 00
149	Becket Straps.....	.....	.....	4 00	6 00	.....	8 00
151	Bottom Guards and Guides.....	3 50	4 00	5 00	7 00	8 00	10 00
152	Bottom Side Plates and Crosshead.....	3 20	6 00	7 25	11 00	15 00	24 00
153	Bottom Hook.....	3 00	5 00	6 00	7 00	12 00	15 00

CHAIN HOISTS.

The Duplex Block, Screw Geared.

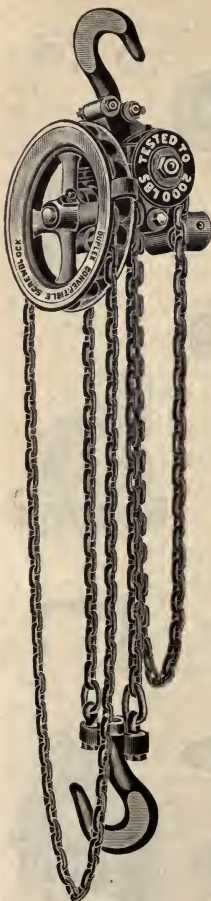
The Duplex is next best to the Triplex Block, its efficiency is at least twenty-five per cent higher than that of any Screw Hoist of previous design, and it is correspondingly faster and more powerful.

Its leverage or power is obtained by a worm gear of improved design, running in oil contained in an oil-tight casing, which insures perfect lubrication and the exclusion of dust.

The hand chain guides are so placed that the operator can stand clear of the load without wasting labor by dragging the chain in the guides. The load chains are provided with safety guides to prevent slipping and with swivel connections to prevent fouling of the chain; the worm wheel and load sheaves are carried on a solid steel shaft.

The Duplex Block occupies less head room than any other. Its lightness, combined with durability and safety, makes it the handiest in shifting about for general use. One man can lift the heaviest load, and in speed and efficiency it stands next to the Triplex.

It has a convertible arrangement whereby dispatch, or free lowering, may be obtained.



Capacity in Tons.	Price Complete.	*Regular Hoist in Feet.	Extra Hoist Price per Ft.	Net Weight in Lbs.	† Chain Pull.	
					Lbs.	Feet.
$\frac{1}{2}$	\$ 25 00	8	\$1 20	43	68	40
1	30 00	8	1 50	57	87	59
$1\frac{1}{2}$	40 00	8	1 75	76	94	80
2	50 00	9	2 00	104	115	93
3	75 00	10	2 20	180	132	126
4	95 00	10	2 40	215	142	155
5	140 00	12	3 00	330	145	195
6	180 00	12	3 75	340	145	252
8	210 00	12	4 00	380	160	310
10	275 00	12	4 25	560	160	390

*Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

Extra lengths of chain should be ordered when it is desired to hoist higher. No deduction is made for blocks with less than the regular length of chain.

†Figures denote the pull in pounds required to lift the full load, and the number of feet of hand chain which must be handled to lift the load one foot.

Fig. D. 806.

Discount

CHAIN HOISTS.

Duplex Repairs.

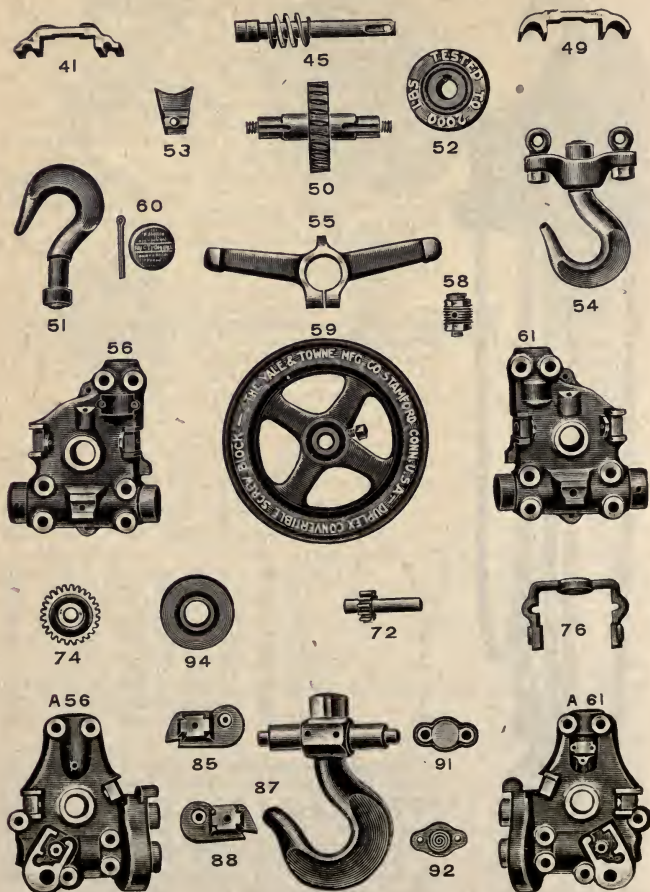


Fig. D 807.

CHAIN HOISTS.

Duplex Repairs.

Prices for Parts of Duplex Blocks, $\frac{1}{2}$ to 5 Tons.*

List No.	NAME.	$\frac{1}{2}$ Ton.	1 Ton.	1 $\frac{1}{2}$ Tons.	2 Tons.	3 Tons.	3 $\frac{1}{2}$ Tons.	4 Tons.	5 Tons.
41	Load chain guide.....	\$0 40	\$0 50	\$0 60	\$0 70	\$1 00	\$1 20	\$1 40	\$1 60
45	Worm and shaft.....	3 00	3 50	4 00	4 50	5 00	6 00	7 00	10 00
49	Load chain guard....	30	40	50	60	70	80	90	1 00
50	Worm wheel.....	3 50	4 00	5 00	6 00	7 00	9 00	11 00	15 00
51	Top hook.....	1 00	1 40	1 80	2 40	3 00	4 00	5 00	6 00
52	Load sheave, per pair.	1 50	2 00	2 50	3 00	3 50	4 00	4 50	5 00
53	Strippers, per pair....	30	40	50	60	70	80	90	1 00
54	Bottom hook swivel and eye bolts.....	2 00	2 50	3 00	3 50	4 50	5 00	6 00	8 00
55	Hand chain guide....	90	1 00	1 30	1 80	2 00	2 40	2 60	2 80
56 } 61 }	Housing, each half....	2 50	3 00	4 00	5 00	6 00	7 00	10 00	15 00
58	Friction plug.....	1 20	1 40	1 70	2 00	.....	.....	.....	.....
59	Hand wheel,*see below	1 50	1 60	2 50	3 00	3 50	4 00	4 50	5 00
60	Friction plug cover..	30	30	40	50	.....	.....	.....	.....
72	Pinion shaft.....	.....	.....	.....	.....	4 00	4 20	4 40	4 60
74	Gear.....	.....	.....	.....	.....	1 60	1 80	2 00	2 20
91	Friction plug cover...	.....	.....	.....	.....	50	50	50	50
92	Friction plug.....	.....	.....	.....	.....	2 50	3 00	3 50	4 00
	Hand chain, per foot†	25	25	25	25	25	40	40	40
	Load chain, per foot.	37 $\frac{1}{2}$	40	42 $\frac{1}{2}$	45	50	55	55	60

Prices for Parts of Duplex Blocks, 6 to 10 Tons.

List No.	NAME.	6 Tons.	7 Tons.	8 Tons.	10 Tons.
41	Load chain guide.....	\$ 1 70	\$ 1 80	\$ 1 90	\$ 2 50
45	Worm and shaft.....	12 00	16 00	18 00	22 00
49	Load chain guard.....	1 10	1 20	1 30	1 40
50	Worm wheel.....	16 00	18 00	20 00	25 00
51	Top hook.....	7 00	8 00	12 00	15 00
52	Load sheave, per pair.....	5 50	6 00	8 00	9 00
55	Hand chain guides.....	3 00	3 00	3 00	4 00
A56 } A61 }	Housing, each half.....	16 00	18 00	20 00	30 00
59	Hand wheel.....	5 00	5 00	6 50	7 00
72	Pinion shaft.....	4 80	5 00	5 20	6 00
74	Gear.....	2 30	2 40	2 50	3 00
76	Bottom guides, per pair.....	4 50	5 00	6 00	7 00
87	Clevis pin.....	50	60	70	1 00
A85 } A88 }	Strippers per pair.....	1 50	2 00	2 50	3 50
87	Bottom hook, swivel and eye bolts....	12 00	16 00	20 00	25 00
91	Friction plug cover.....	50	50	60	60
92	Friction plug.....	4 20	4 40	4 60	5 40
94	Bottom sheaves, per pair.....	3 00	4 00	6 00	7 00
	Load chain, per foot.....	50	55	55	60
	Hand chain, welded, per foot.....	40	40	40	40

*In ordering Hand Wheels or Hand Chain note number of pockets for chain links in rim of wheel.

†Welded hand chain for old model Blocks 37 $\frac{1}{2}$ c per foot for $\frac{1}{2}$, 1, 1 $\frac{1}{2}$ and 2-ton sizes.

CHAIN HOISTS.

Harrington Screw.

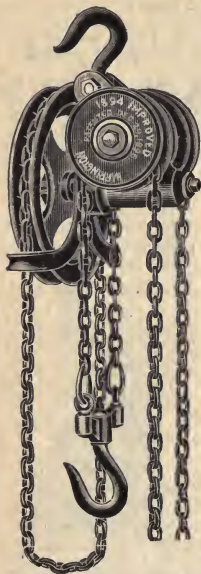


Fig. D. 808.

Lift.	Capacity, Tons.	Price.	Extra Lift per Foot.	Weight of Machine.
8 ft.	$\frac{1}{4}$	\$ 22 50	\$1 00	41 lbs.
8 "	$\frac{1}{2}$	25 00	1 20	68 "
8 "	1	30 00	1 50	75 "
8 "	$1\frac{1}{2}$	40 00	1 75	106 "
9 "	2	50 00	2 00	160 "
10 "	3	75 00	2 20	247 "
10 "	4	95 00	2 40	325 "
12 "	5	140 00	3 00	483 "
12 "	6	180 00	3 75	555 "
12 "	8	210 00	4 00	735 "
12 "	10	275 00	4 25	785 "

Discount.....

HARRINGTON HOIST REPAIRS

Cap'y Tons	21	22	23	24	25	26	27	28	29
$\frac{1}{4}$	\$1 00	\$3 00	\$1 60	\$25	\$30	\$1 50	\$30	\$1 00	\$70
$\frac{1}{2}$	1 50	3 20	1 80	25	35	2 00	40	1 50	90
1	1 50	4 00	2 00	25	40	2 50	40	1 50	90
$1\frac{1}{2}$	2 50	5 00	3 00	25	45	4 00	50	2 50	1 20
2	2 80	6 00	3 50	25	47	5 50	60	3 20	1 50
3	5 00	7 00	6 00	25	50	9 50	1 50	6 50	....
4	7 00	9 00	8 50	30	55	11 00	1 50	7 00	....
5	8 00	16 00	10 50	35	75	16 00	2 00	12 00	....
6	11 50	16 00	15 00	35	90	16 00	2 00	12 00	....
8	12 00	23 00	18 00	35	1 10	20 00	2 00	16 00	....
10	12 00	23 00	20 00	35	1 10	20 00	2 00	16 00	....
15	12 00	23 00	18 00	35	1 10	20 00	2 00	16 00	....

Cap'y Tons	30	31	32	33	34	35	36	37	38	39	45	46	47	*Hand Chain	†Load Chain
$\frac{1}{4}$	\$1 70	\$ 60	\$1 70	....	....	\$ 30	\$ 20	....	....	....	....	....	....	\$4 25	\$ 7 10
$\frac{1}{2}$	2 00	80	2 00	....	....	40	20	....	....	....	....	....	....	4 25	8 56
1	2 60	90	2 60	....	....	50	20	....	....	....	....	....	....	4 25	10 10
$1\frac{1}{2}$	3 50	1 30	3 50	....	....	55	25	....	....	....	....	....	....	4 50	11 94
2	4 10	1 80	4 10	1 50	2 00	60	30	....	....	....	....	....	....	5 00	13 97
3	5 20	4 00	5 20	2 00	3 00	1 00	50	....	....	....	....	....	....	5 50	17 20
4	11 00	6 00	11 00	3 00	3 50	1 50	50	....	....	....	....	....	....	6 90	24 20
5	13 50	10 00	13 50	4 00	5 00	2 50	1 00	....	....	....	....	....	....	9 80	35 25
6	19 50	10 00	19 50	7 00	5 00	2 50	1 00	....	....	....	....	....	....	10 15	45 60
8	23 00	14 00	23 00	8 00	6 00	3 00	1 00	5 00	3 00	5 00	....	....	....	10 15	54 90
10	35 00	14 00	35 00	8 00	8 00	3 00	1 00	7 00	3 00	7 00	....	....	....	10 15	66 90
15	44 00	30 00	44 00	8 00	6 00	3 00	1 00	5 00	3 00	5 00	10 00	4 00	4 00	19 60	110 00

*Price is for regular lift.

†Price is for regular lift with hook and swivel

Discount.....

DETROIT PNEUMATIC GEARED HOISTS.

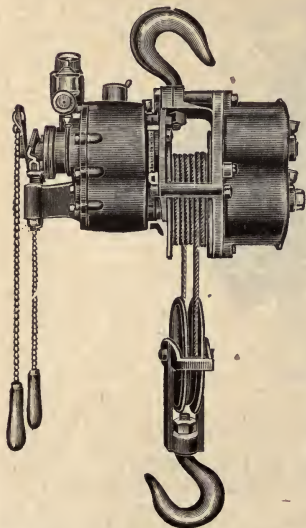


Fig. D. 809.

These Hoists are designed and constructed to handle loads ranging from one to 12½ tons to a height of 25 feet, or more, with the least possible consumption of air, and hold the load with air hose detached. Can be operated by ordinary labor.

The valve is operated by two chains reaching to within five feet of the floor, and the motor may be instantly started stopped or reversed and is self-closing when chains are released. Positive automatic brake.

All parts are interchangeable, and all ordinary repairs can be made in any machine shop.

All Hoists are guaranteed to stand up to test card furnished with every machine. All tests are based on 80 lbs. air pressure at motor.

Hoists can be built to use on trolleys to run on I beams or channels. We will design and furnish trolley as may be required at a reasonable price.

We manufacture Compressed Air Motors, and special hoisting machinery for cranes or other purposes.

Always specify height of lift.

Size, No.	Capacity, Tons.	Height of Lift, Feet.	Extra Feet Lift, Per Foot.	Speed of Lift per Minute, Feet	Shortest Distance Between Hooks, Inches.	Weight, Pounds.	Price.
1	1	10	0.10	35	30	215	\$180 00
2	1½	10	0.20	22	38	250	} 210 00
3	2	10	0.25	16	38	250	
4	3	10	0.30	11	38	275	
4½	4	10	0.30	10	38	325	275 00
5	5	12	0.45	10	50	565	330 00
6	6	12	0.45	9	50	720	375 00
7	8	12	0.60	8	55	925	450 00
8	10	12	0.75	6	55	1000	500 00
9	12½	12	0.90	5	65	1100	600 00

Discount.....

ELECTRIC HOIST.

Yale & Towne.

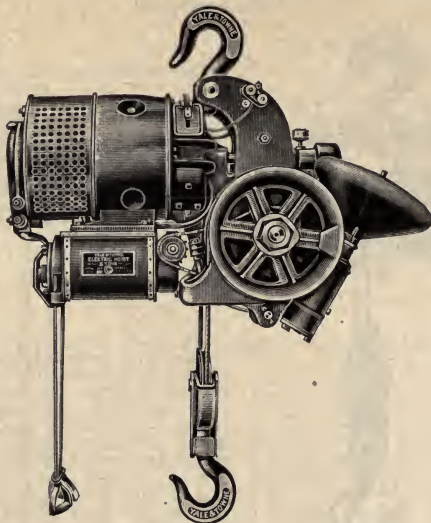


Fig. D. 810.

Supplied for 110 and 220 volts from stock, and for other voltages to order. 220 volts usually gives the best power service.

Capacity in Tons.	Nominal Horse Power of Motors.	Speed, per Foot, Minute. (Loaded)	Standard Hoist.	Price, Standard Hoist.	Maximum Hoist.	Price, Maximum Hoist.	Weight in Lbs.
*1	3	20	15 feet	\$400 00	45 feet	\$415 00	640
2	3	15	15 "	415 00	45 "	430 00	640
4	3	7	15 "	450 00	22 "	465 00	820
6	3	5	10 "	485 00	15 "	500 00	870
5	7	15	15 "	700 00	45 "	715 00	1560
10	7	7	15 "	950 00	22 "	965 00	1800

*The 1-ton Hoist is similar in detail and measurements to the 2-ton Hoist. It has the same motor which is as small as is desirable for hoisting service.

The prices above include standard controllers with two hoisting speeds. These standard controllers meet all needs except extremely delicate foundry work.

Collector rings on top hook, \$25 00 extra.

Special controllers with five graduations of speed may be supplied at \$75 00 extra.

Discount.

ELECTRIC TRIPLEX HOIST.

Yale & Towne.

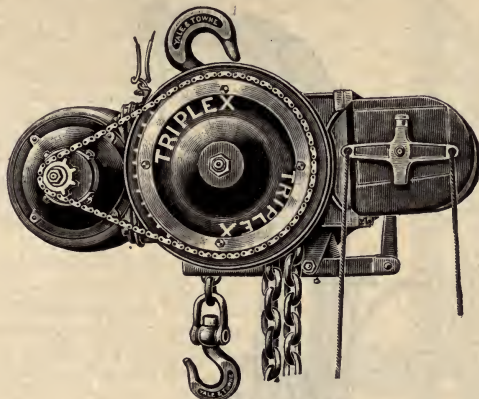


Fig. D. 811.

A Power Hoist Reduced to its Simplest Terms.

Speeds of the 1 ton size Electric Triplex Hoist.

Load Carried.	Hoisting Speed.	Lowering Speed.
0 lbs.	40 ft. per min.	40 ft. per min.
300 "	26 " " "	39 " " "
900 "	19 " " "	36 " " "
2000 "	12 " " "	26 " " "

This Hoist is in a class half way between the Triplex Chain Block and the heavy duty Y. & T. Electric Hoists.

It will be supplied for any voltage, direct current.

Electric Triplex Hoist, $\frac{1}{2}$, 1 and 2 ton.

Capacity.	Dimensions.			Weight.	Price.		
	Min. Dist. between Hooks.	Overall Width.	Overall Length.		Hoist with Standard Lift, Direct Current.	Hoist with Standard Lift, Alternating Current.	Extra Lift, per Foot.
$\frac{1}{2}$ Ton.	18 in.	17 in.	33 in.	250 lbs	\$225 00	\$300 00	\$0 80
1 "	22 "	18 "	37 $\frac{1}{4}$ "	400 "	260 00	340 00	90
2 "	28 $\frac{1}{2}$ "	18 "	37 $\frac{1}{4}$ "	500 "	305 00	385 00	1 45

Discount.....

PORTABLE FLOOR CRANE AND HOIST.

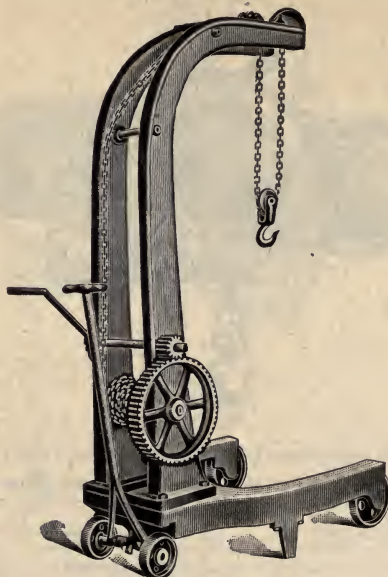


Fig. D. 812.

This hoist will handle from 1½ to 3 tons (according to size) and can be easily handled by one or two men. Constructed of the very best material, and put together with the greatest care. The above cut shows hoist with a 12-inch bed. Any of these hoists furnished with low bed at same price when so ordered.

Size.	Capacity, Lbs.	Price Each,	Total Height, Inches.	Lift, Inches.	Over Hang, Inches.	Width of Bed.		Length of Bed, Inches.	Height of Bed, Inches.	Weight, Lbs.
						Outside	Inside.			
No. 1	3000	\$100 00	65	51	26	29 in.	22 in.	35	12	600
No.*2	4000	\$112 50	77	63	29	32 in.	25 in.	38	12	740
No.*3	5000	\$125 00	89	75	32	34 in.	28 in.	41	12	890
No.*4	6000	\$150 00	101	87	34	40 in.	32 in.	48	12	1150

*Most useful sizes for average shop.

Discount

ECONOMY STEEL TIERING MACHINE OR PORTABLE ELEVATOR.

These machines have all the advantages of the regular freight elevator with its platform construction, and in addition are portable and can be moved to any part of warehouse with as great facility as the ordinary truck. The machine furnishes its own foundation and requires no overhead support of any kind.

We are prepared to supply these machines in various forms to suit requirements, and prices will be quoted on receipt of specifications or data.

Hand Operated Machines.

These machines are built in any capacity from 250 to 2,000 pounds; any height from 5 to 16 feet; uprights are fitted with hinges which can be located to suit the height of the doors or other openings that the machine is to pass through.

Power Operated Machines.

These machines are built to operate by electricity or compressed air, 110 to 250 volts direct current, 110 to 440 volts, 2 or 3-phase, 25 or 60-cycle, alternating current; and by an air pressure from 40 to 100 pounds per square inch. Top and bottom automatic stop devices, solenoid or magnetic brakes on direct current machines, and a simple and positive acting controller conveniently placed for operation. Built in any capacity from 250 to 4,000 pounds, any height from 5 to 30 feet, and to lift their loads with speeds ranging from 25 to 50 feet per minute. An extremely simple and convenient plug and receptacle are provided, and with 50 feet of flexible cable or conductor it is possible for an operator to pile or tier more goods or merchandise than can be done with any other form of hoisting device.

When asking for prices, please give the following information:

(1) Total height of machine. (2) Lift of platform varies from 21 inches to 48 inches less than total height of machine, depending on capacity. (3) Maximum load to lift. (4) Maximum height of lowest opening machine is to pass through. (5) Kind of floor in warehouse. (6) Material to handle. (7) Speed desired (feet per minute). (8) Power: Hand—electric—air. (9) Alternating or direct current. (10) Voltage—Phases—Cycles. (11) Pounds pressure. (12) Number of receptacles wanted.

Note.—7. For power machines only: 25, 30, 40 and 50 feet per minute, 30 being standard.

Prices upon application.

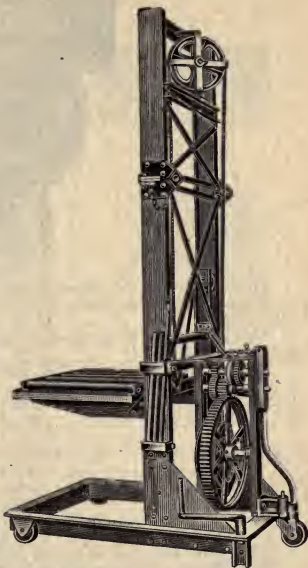
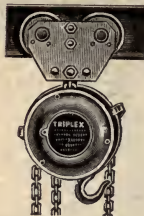
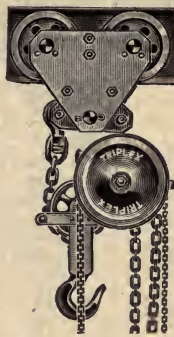


Fig. D. 813.

Hand Power Machine.

PATENT STEEL TROLLEYS.

Complete with Triplex Blocks.

Fig. D. 815.
1/2 to 2 Tons.Fig. D. 816.
3 and 4 tons.Fig. D. 817.
5 to 10 Tons.

Prices of Trolleys and Triplex Blocks Complete.

Capacity in Tons.	Standard Sizes of I-Beam in Inches.	Regular Hoist in Ft.	Prices of Trolleys and Triplex Blocks Complete.					
			With Block Hooked in Trolley.			With Clevis Connection.		
			Plain Trolley.	† Geared Trolley.	Minimum Distance in inches, Bottom of I-Beam to inside of lower Hook of Block.	Plain Trolley.	† Geared Trolley.	Minimum Distance from Bottom of I-Beam to inside of lower Hook.
1/2	5	8	\$ 51 00		20	\$ 55 00		13
1	6	8	65 00	\$ 95 00	23	70 00	\$100 00	17
1 1/2	7	8	85 00	120 00	26	90 00	125 00	20
2	8	9	100 00	135 00	32	105 00	140 00	21
3	9	10	130 00	160 00	40	130 00	160 00	26 1/2
4	10	10	160 00	205 00	45	160 00	205 00	38
5	12	12	205 00	240 00	55	205 00	240 00	41
6	15	12	245 00	295 00	56	245 00	295 00	41
8	20	12	295 00	350 00	63	295 00	350 00	48
10	24	12	350 00	400 00	68	350 00	400 00	48

*For price of extra hoist with plain trolley see regular Triplex Block, list. Extra hoist with geared trolley same price as extra hoist for Triplex Blocks plus 50 cents per foot.

†Geared Trolleys should nearly always be used for 3 tons and over to facilitate easy movement of loaded trolley along the track.

Discount.....

PATENT STEEL TROLLEYS.

Fig. D. 818.
Plain Trolley.Fig. D. 819.
Geared Trolley.

Four Wheeled—for Standard Light Steel I-Beams.

Capacity in Tons.	Standard Size of I-Beam in Inches.	Plain Trolleys.		Geared Trolleys.		Diameter of Wheels in Inches.
		Price.	Weight, in Lbs.	Price.	Weight in Lbs.	
$\frac{1}{2}$ tons	4	\$ 14 00	25	.....	.....	3 $\frac{1}{2}$
$\frac{1}{2}$ "	5	16 00	30	.....	.....	4
1 "	6	20 00	50	\$ 50 00	90	5
1 $\frac{1}{2}$ "	7	25 00	95	60 00	140	6
2 "	8	30 00	115	65 00	165	7
3 "	9	40 00	140	70 00	180	8
4 "	10	50 00	210	95 00	320	9
5 "	12	65 00	300	100 00	350	10 $\frac{1}{2}$
6 "	15	80 00	530	130 00	600	13
8 "	20	95 00	550	150 00	650	13
10 "	24	110 00	600	160 00	670	13

Supplementary Specifications for Steel Plate Trolleys.

Capacity in Tons.	Distance in Inches from Bottom of I- Beam to Bot- tom of Eye in Trolley.	Smallest Radius for Curve in Inches.	Resistance to Motion on Straight Track.		
			Plain Trol- leys, Di- rect Pull.	Geared Trolleys.	
				Chain Pull in Lbs.	Chain Travel in Feet to Move Trolley 1 Foot.
$\frac{1}{2}$	5	21	26	.....	.....
1	6	21	47	15	.....
1 $\frac{1}{2}$	7	34	65	24	.....
2	8	36	74	23	.....
3	8	42	106	30	5
4	8	48	145	45	5
5	10	54	60	55	5
6	11	66	70	23	4 $\frac{1}{2}$
8	12	66	90	28	4 $\frac{1}{2}$
10	14	66	115	35	4 $\frac{1}{2}$

The trolley travel is effected in the "Plain" trolleys by pulling or pushing directly on the load. In the "Geared" trolleys the travel is effected by the pendant hand chain, which is geared to the trolley truck wheels. "Brown" steel trolleys can be widened to suit the flange of beams heavier or deeper than the standard size. When ordering trolleys with or without hoists, state exact size and width of I-beam. If beam is not standard, show its cross section, with any obstruction to the travel of the trolley. Table of clearance dimensions on application.

Discount.....

CAST IRON TROLLEYS.

These can only be used on the Standard beam of the weight specified.

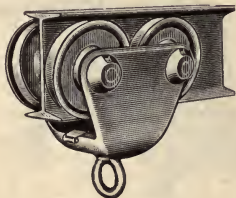


Fig. D. 820.

Capacity in Tons.	Size of I-Beam.	Price.
With Plain Bearings.		
$\frac{1}{2}$	5 in.-9 $\frac{1}{4}$ lb.	\$ 8 00
1	6 " -12 $\frac{1}{4}$ "	10 50
1 $\frac{1}{2}$	7 " -15 "	13 50
2	8 " -18 "	17 00
With Roller Bearings.		
1	6 in. -12 $\frac{1}{4}$ lb.	\$17 50
1 $\frac{1}{2}$	7 " 15 "	22 00
2	8 " 18 "	27 00
3	9 " 21 "	37 50

Discount.....

FLAT RAIL TROLLEYS.

To Run on Flat Steel Bars.

The "Plain" trolley is shown in the cut. The "Geared" trolley is fitted with hand chain and sprocket wheel for trolley travel.

Capacity in Tons.	Size of Rail in Inches.	Greatest Distance Between Supports in Feet	Price of Trolleys.	
			Plain.	Geared.
$\frac{1}{4}$ and $\frac{1}{2}$	3x $\frac{1}{2}$	6	\$ 9 00	.....
		5	9 00	.....
		6	15 00	\$35 00
1, 1 $\frac{1}{2}$, 2	4x $\frac{3}{4}$	5	15 00	35 00
		4	15 00	35 00
		6	30 00	50 00
3 and 4	6x1	5	30 00	50 00

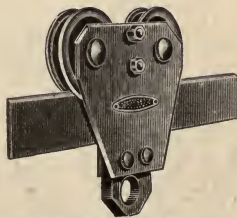


Fig. D. 821.

Discount.....

Table of clearance dimensions on application.

"BROWNHOIST" SAFETY CRABS.

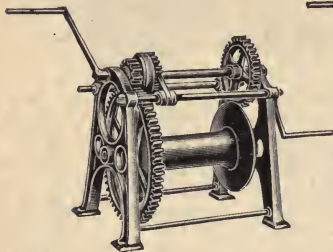


Fig. D. 822.
Safety Crab.

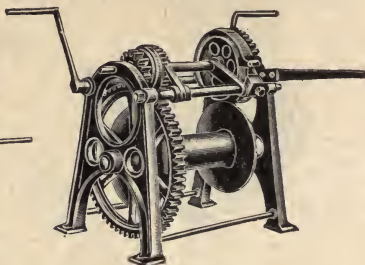


Fig. D. 823.
Safety Crab, with Strap Brake.

These have a safety lowering device which operates automatically. The load is always self-sustained and cannot run down under any condition. The flying back of the handles is absolutely prevented and the safety of the operator and of the load is always assured.

Lowering is effected by simply turning the cranks backward under light pressure, leaving the safety pawl in gear to control the load.

Number of Crab.	Size of Regular Barrels.		Capacity with Double Blocks in Tons.*	Price.	Add for Each Additional Six Inches in Length of Barrel.	Add for Strap Brake.	Regular Weight.
	Diameter in Inches.	Length in Inches.					
21	4½	12	1½	\$ 65 00	\$ 7 00	None	230 lbs.
22	5	16	3	75 00	8 00	\$27 00	370 "
23	6	20	4½	90 00	10 00	27 00	520 "
25	7	24	7½	130 00	14 00	27 00	810 "

*The safe load on single rope direct on the barrel is one-third or that given above, 33½ per cent being allowed for the friction of the double sheave block and tackle.

Discount.....

"BROWNHOIST" SAFETY DERRICK WINCHES.

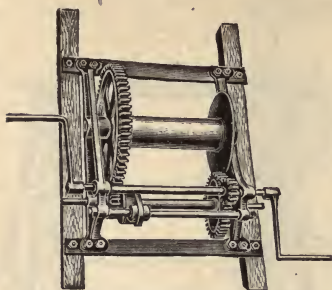


Fig. D. 824.
Safety Winch for Double Pole.

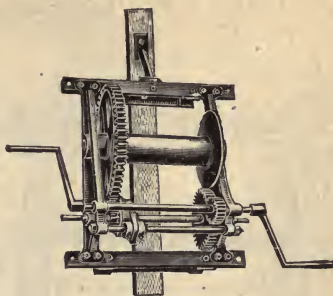


Fig. D. 825.
Safety Winch with Single Pole Attachments.

These are provided with automatic safety brakes. Dropping of the load is impossible and the handles cannot fly back, thus removing all danger so that a boy can lower safely.

Safety Winches can be furnished with sprocket wheels for hand rope or chain instead of cranks, or capstan barrel in place of straight barrel, without extra charge. They can also be furnished with large drums or with capstan end on lower barrel shaft at extra cost.

A strap brake for quick lowering can be furnished on any of the three larger sizes as indicated, but is never used on the one-half-ton machines. Except on the smallest size, two speeds are provided and the fast speed can always be used for safety lowering.

The attachment for double pole will always be furnished unless otherwise ordered.

Derrick Winches.

Number of Winch.	Size of Regular Barrels.		Capacity with Double Blocks in Tons.*	Price, Double Pole.	Add for Each Additional Six Inches in Length of Barrel.	Add for Strap Brake.	Weight, Standard Winch.
	Diam.	Length.					
31	4½	12	1½	\$ 65 00	\$ 7 00	None	220 lbs.
32	5	16	3	75 00	8 00	\$27 00	400 "
33	6	20	4½	90 00	10 00	27 00	580 "
35	7	24	7½	130 00	14 00	27 00	860 "

Single Pole Winch \$7.00 additional to above price.

*The safe load on single rope direct on the barrel is one-third of that given above, 33½ per cent being allowed for the friction of the double sheave block and tackle.

Discount.....

HOISTING CRABS.

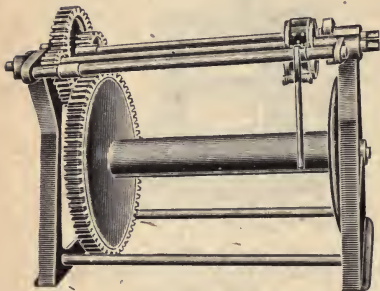


Fig. D. 826.
Double Purchase.

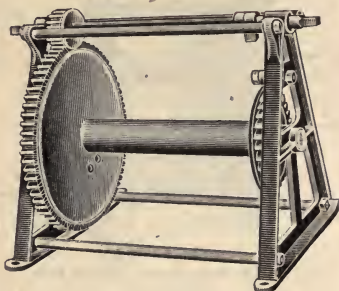


Fig. D. 827.
Single Purchase.

DOUBLE PURCHASE.					SINGLE PURCHASE.			
No.	Cap'y Tons.	Drum, Inches.	Price Cast Iron Gears.	Price Steel Gears.	No.	Cap'y Tons.	Wt., Lbs.	Price.
9	5	4½x28	\$65 00	\$80 00	13	2	300	\$45 00
10	5	6½x24	70 00	85 00	14	3	400	55 00
11	8	4½x28	80 00	95 00	Brazes, extra.. 6 00			
12	8	6½x24	85 00	100 00	Gears made of malleable iron			

Discount.....

Frames of malleable iron.

Shafts and drum are of steel.

We can furnish concave drums if desired, also other drums of special design upon application.

Pawl stop to all.

Made for manila or wire rope.

Double purchase crabs are provided with fast and slow gear, pawl and stop, also lever brake for lowering purposes.

Capacities based upon using 2 or 3 sheave rope blocks in connection with crab.

CRABS.

Inclined Frame.

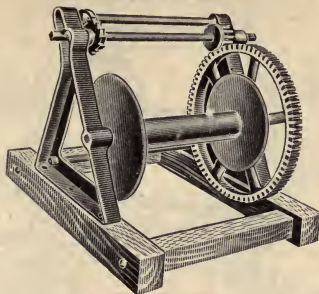


Fig. D. 828.

Wood or Malleable Iron Frame.

Single geared, as per cut, with pawl stop, capacity 2½ tons.....	\$50 00
Single geared as per cut, with pawl stop, capacity 5 tons.....	60 00
Double geared, with pawl stop, capacity 5 tons.....	75 00
Double geared, with pawl stop, capacity 8 tons.....	90 00
Strap hand brake for either, extra.....	6 00
Steel gears instead of cast iron, extra.....	5 00

Discount.....

Derrick Winches—Double Purchase.

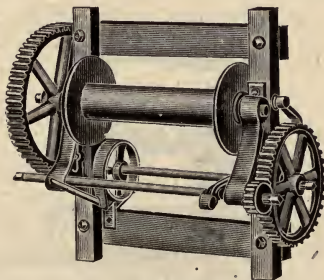


Fig. D. 829.

These Winches are furnished with strap brakes for rapidly lowering the load. They are made for either wire rope or manila rope. Are double geared and so fitted that they can be thrown "single gear" when light, quick work is wanted.

No.	For	Dimensions of Drum.	Capacity.	Price, Iron Gears.	Price Steel Gears.
A	Manila Rope	6 x 21 in.	20 ton	\$75 00	\$90 00
B	"	6 x 26 "	20 "	75 00	90 00
C	Wire Rope	9 x 16 "	20 "	80 00	95 00
D	"	9 x 21 "	20 "	80 00	95 00

Discount.....

DERRICK WINCHES.

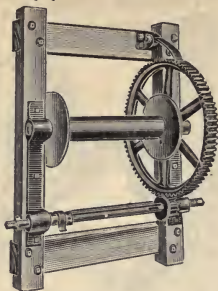


Fig. D. 830.

Oak Frame.

Furnished for wire or manila rope.

These are simple and strong, made from the very best materials, and built with a view of durability. The frames are made from 4 x 4 seasoned oak.

Single geared, as per cut, with pawl stop.	{	capacity 2 tons.....	\$40 00
Strap Hand Brake for either, extra.....		3 "	50 00
Larger or smaller sizes made to order.			6 00

Discount

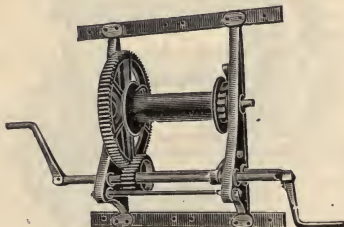


Fig. D. 831.

Steel Frame.

Furnished for wire or manila rope.

One for double Poles always sent unless otherwise ordered.

Capacity with Sheaves.	Capacity direct.		List.
5 Ton.....	1 Ton		\$ 65 00
8 "	1½ "		90 00
10 "	2 "		110 00
12 "	2½ "		120 00
15 "	3 "		140 00

With pawl Stop and Strap Brake.

Discount

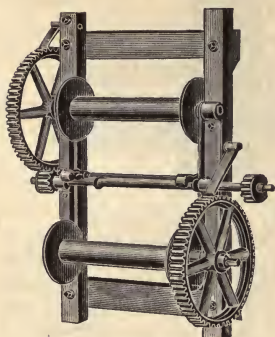
DERRICK WINCHES.**Double Drum.**

Fig. D. 832.
Single Purchase.

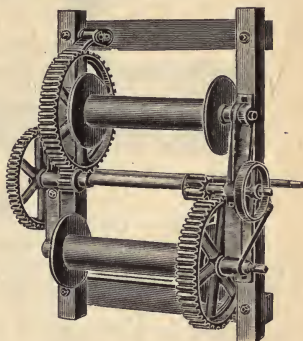


Fig. D. 833.
Double Purchase.

Single Purchase

These Winches are designed for handling both the Boom of the Derrick and its load. The single purchase is especially adapted to light, quick work. Made as shown below for either wire or manila rope.

No.	Dimensions of Drum.	Capacity.	Price.
40 Wire Rope	9 x 16 in.	2 Ton	\$65 00
41 " " "	10 x 18 "	2 "	70 00
42 Manila Rope	5½ x 22 "	2 "	70 00
43 " " "	6 x 30 "	2 "	75 00

Discount.....

Double Purchase.

The double purchase Winches are suitable for handling heavy loads, and are powerful and well built machines.

No.	Drum.	Capacity.	Iron Gears Price.	Steel Gears Price.
50 for Wire Rope	9 x 16 in.	20 Ton	\$110 00	\$135 00
51 " " "	9 x 21 "	20 "	110 00	135 00
52 Manila Rope	6 x 21 "	20 "	100 00	125 00
53 " " "	6 x 26 "	20 "	100 00	125 00

Discount.....

CENTER CRAB.

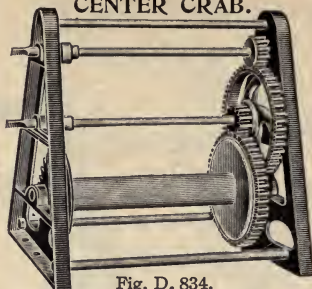


Fig. D. 834.

All gears, shafts and drum are of steel. The frame of malleable iron.

Furnished with or without brake. Made for manila or wire rope.

Above crab will be found very useful for the erection of heavy machinery, setting boilers, raising smoke stacks, wrecking buildings, etc.

No.	Weight, Lbs.	Capacity, Tons.	Price, Each
1	500	20	\$140 00
2	400	16	125 00
3	340	12	100 00
4	300	8	80 00

Discount.....

WAGON WINDLASS.

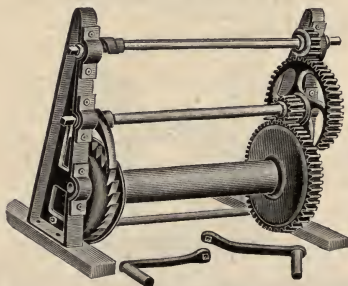


Fig. D. 835.

For use on machinery trucks, stone trucks, safe trucks, etc., to handle heavy machinery, safes, etc.

Steel gears, malleable iron stands, steel shaft and drum, making them light and strong.

No.	Weight, Lbs.	Capacity, Tons.	Price, Each
1	425	20	\$125 00
2	350	16	110 00
3	300	12	90 00
4	225	8	75 00
5	200	4	60 00

Discount.....

HARD MAPLE ROLLERS.

For all purposes.

Fig. D. 835.
(Enlarged Cut).

Turned from air seasoned quarter-sawed Rock Maple Squares. There are no hearts in these rollers to weaken them—only the best and toughest parts of sound prime logs being used. They will stand twice the strain of the common rollers and last many times longer.

All rollers are treated with boiled linseed oil, and ends are painted before shipping.

SIZES.		PRICE, EACH.	SIZES.		PRICE, EACH.
Diameter, Inches.	Length.		Diameter, Inches.	Length.	
3	3 ft.	\$0 50	6	6 ft.	\$2 70
3	4 ft.	60	6	7 ft.	3 10
3½	3 ft.	70	7	3 ft.	2 00
3½	4 ft.	85	7	4 ft.	2 50
4	3 ft.	80	7	4 ft. 8 in	2 90
4	4 ft.	1 00	7	5 ft.	3 10
4	5 ft.	1 25	7	6 ft.	3 60
4	5 ft. 6 in.	1 35	7	7 ft.	4 30
5	3 ft.	1 10	7½	4 ft.	2 80
5	4 ft.	1 35	7½	4 ft. 8 in.	3 30
5	5 ft.	1 70	7½	5 ft.	3 50
5	6 ft.	1 90	7½	6 ft.	4 20
5½	5 ft.	2 00	8	4 ft.	3 30
5½	6 ft.	2 30	8	5 ft.	4 00
6	3 ft.	1 50	8	6 ft.	4 70
6	4 ft.	1 80			
6	4 ft. 8 in.	2 10			
6	5 ft.	2 25			

Discount.....

Intermediate sizes take next higher list.

We furnish Special Rollers for Mines and Solid Wheels for House Movers.

DERRICKS.

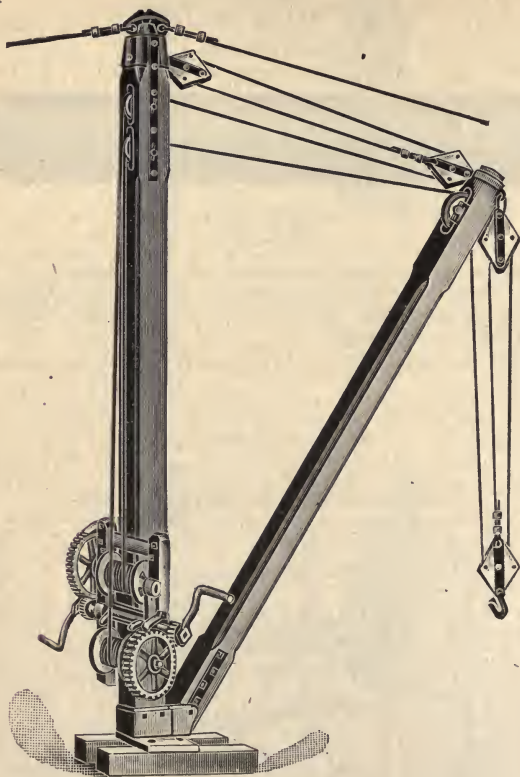


Fig. D. 836.

We are prepared to quote on either Timber, or Steel Lattice Derricks, in any style for hand or power. We can also furnish complete sets of irons, sheaves, etc., when purchasers wish to build for themselves. Applications for price should be accompanied by full dimensions and weight of load to be lifted.

DERRICK SKIPS.

Wood.

**Fig. D. 837.**

Dumps by pulling the trip line. Made of oak with the corners thoroughly tied by angle irons and straps. The angle iron at the open end is stiff and does not permit the skip to sag out of shape when loaded as do other makes of skips having only flat straps. The chains are made of refined iron.

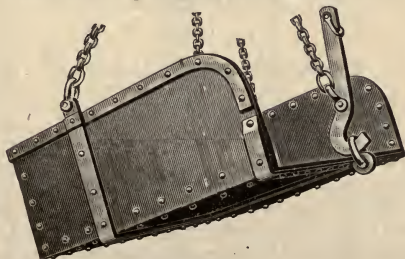
1 cubic yard capacity—5 feet by 5 feet by 14 inches.

2 cubic yards capacity—6 feet by 6 feet by 18 inches.

We can also furnish other styles and sizes. Prices upon application.

STEEL.

For Handling Broken Stone, Brick, Etc.

**Fig. D. 838.**

The dumping device is a trigger hook on front, to which a rope is attached. Standard skip is 6 feet long, 5 feet wide, 14 inches deep. Made in any size. Prices upon application.

HOISTING ENGINES.

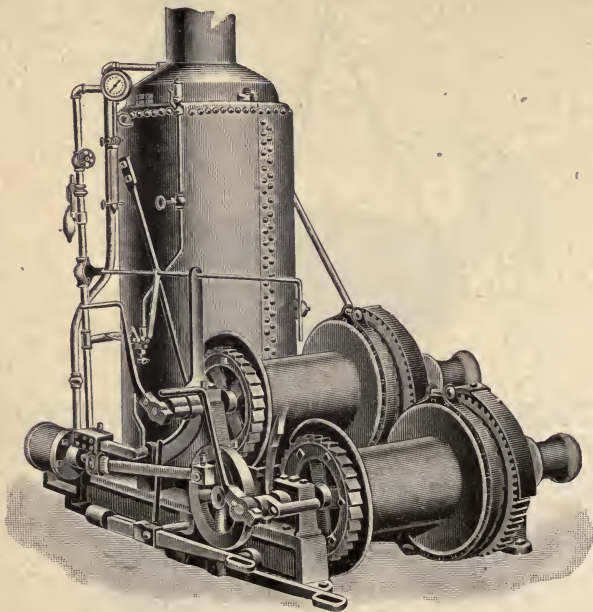


Fig. D. 839.

Cut Shows Engines No. 13 to 17 B

Nos. 1 to 6—Double Cylinder, Single Drum.

Nos 13 to 17 B.—Double Cylinder, Double Drum.

Nos. 25 to 30—Double Cylinder, Double Drum, with four independent winch heads. The engine is adapted for general construction and bridge erection work, where it is necessary to combine a winch engine, and yet have the friction drums for ordinary hoisting purposes.

The Drums are equipped with brakes, ratchets and pawls, and in addition, have an independent winch head on the end of each drum shaft, which run loose on the shafts and are operated by jaw clutches

See details on opposite page.

HOISTING ENGINES.

Number of Engine.	Horse-Power.	Dimensions of Cylinders.		Dimensions of Drums.		Weight Hoisted, Single Rope.	Weight of Pile-Driving Hammer.
		Diam., Inches.	Stroke Inches	Diam., Inches.	Length Inches.		
1	6	5	6	10	18	1500	1000
2	12	6½	8	14	22	3000	2000
3	16	6½	10	14	22	4000	2800
4	20	7	10	14	26	5000	3500
5	30	8½	10	14	26	8000	4500
6	50	10	12	16	32	12000	8000
13	6	5	6	10	18	1500	1000
14	12	6½	8	14	22	3000	2000
15	16	6½	10	14	22	4000	2800
16	20	7	10	14	26	5000	3500
17	30	8½	10	14	26	8000	4500
17A	35	9	10	14	30	9000	5500
17B	45	10	10	16	32	11000	7500
25	6	5	6	10	18	1500	1000
26	12	6½	8	14	22	3000	2000
27	16	6½	10	14	22	4000	2800
28	20	7	10	14	26	5000	3500
29	30	8½	10	14	26	8000	4500
30	50	10	12	16	32	12000	8000

Number of Engine.	Dimensions of Boilers.			Floor Space Required for Bed Plate.		Estimated Shipping Weight, with Boiler and Fixtures Complete.
	Diameter, Inches.	Height, Inches.	2-Inch Tubes.	Width, Inches.	Length, Inches.	
1	30	72	42	40	57	4100
2	36	75	67	50	71	6500
3	36	84	67	54	75	7200
4	40	84	90	54	75	7800
5	42	96	98	57	79	9300
6	54	108	174	70	97	18000
13	30	72	42	40	70	5000
14	36	75	67	50	86	8000
15	36	84	67	54	89	8800
16	40	84	90	54	89	9500
17	42	96	98	57	94	11000
17A	48	96	138	63	100	13000
17B	50	102	150	68	110	17000
25	30	72	42	40	70	5500
26	36	75	67	50	86	9200
27	36	84	67	54	89	10900
28	40	84	90	54	89	11500
29	42	96	98	57	94	14000
30	54	108	174	70	117	24500

Prices on application.

UPRIGHT TUBULAR BOILERS.

With Full Length Tubes.

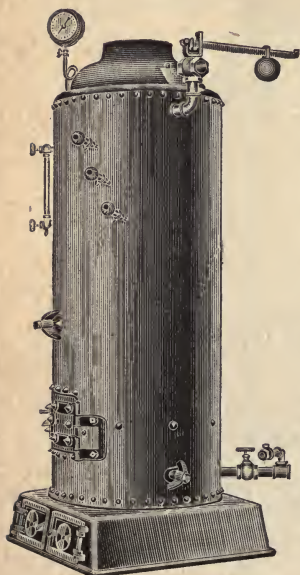


Fig. D. 840.

Horse Power.....	4	5	6
Diameter of Boiler.....in inches	24	24	24
Height of Boiler.....in feet	4	5	6
Diameter of fire box.....in inches	20	20	20
Height of fire box.....in inches	24	24	24
Thickness of steel in shell.....in inches	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Thickness of steel in fire box.....in inches	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Thickness of steel in heads.....in inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Length of tubes.....in inches	24	36	48
Number of tubes (all 2-inch diameter)....	28	28	28
Square feet of heating surface.....	43	58	73
Diameter of smoke stack required.in inches	10	10	10
Weight of bare boiler.....in pounds	900	1000	1100
Weight of base and fixtures.....	300	300	300
Weight of boiler complete.....in pounds	1200	1300	1400

Fixtures comprise base, grates, hood, steam gauge, water gauge, gauge cocks, safety valve, blow-off, check and stop valves. Smoke stack will be furnished at additional prices per foot.

Bases are of cast iron and have double ash doors with registers. Cast iron hood is regularly furnished, but we will furnish cone-shaped hood of sheet steel, if so ordered, without additional charge. Cheesebox hood of sheet steel, with removable top and side outlet, will be furnished, if so ordered, at an additional price.

Prices upon application.

SPECIFICATIONS OF UPRIGHT TUBULAR BOILERS.

With Full Length Tubes.

8	10	12	15	18	20	25	30	35	40	45	50	60	70	70	80	90	100	110	125
30	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	60	66	66	66
5	6	7	6	7	8	7½	8½	9½	9	9½	10	9	10	9	10	11	10	11	12
25	25	25	31	31	31	37	37	37	43	43	43	48	48	54	54	54	60	60	60
27	27	27	27	27	27	30	30	30	30	30	30	30	30	30	30	36	30	36	36
¼	¼	¼	¼	¼	¼	⅜	⅜	⅜	½	½	½	½	½	¾	¾	¾	¾	¾	¾
¼	¼	¼	⅜	⅜	⅜	½	½	½	½	½	½	½	½	¾	¾	¾	¾	¾	¾
⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅞	⅞	⅞	⅞	⅞	⅞
33	45	57	45	57	69	60	72	84	78	84	90	78	90	78	90	96	90	96	108
48	48	48	72	72	72	96	96	96	130	130	130	180	180	212	212	212	270	270	270
89	114	139	167	205	212	287	338	388	486	520	554	662	757	771	883	956	1130	1208	1350
12	12	12	15	15	15	17	17	17	20	20	20	24	24	26	26	26	30	30	30
1400	1550	1700	1900	2150	2400	3000	3350	3700	4200	4500	4800	5500	6000	6800	7400	7800	9000	9500	10400
550	550	550	800	800	800	1000	1000	1000	1600	1600	1600	2100	2100	2500	2500	2500	2800	2800	28000
1950	2100	2250	2700	2950	3200	4000	4350	4700	5800	6100	6400	7600	8100	9300	9900	10300	11800	12300	13200

Boilers 24 inches, 30 inches and 36 inches diameter have two hand-holes in bottom of water leg and one above crown sheet. Boilers 42 inches diameter and larger have three hand-holes in bottom of water leg and three hand-holes above crown sheet.

Fire boxes are thoroughly braced with screw stay bolts.

Longitudinal seams of shell of boilers 30 inches diameter and larger are double riveted. Longitudinal seams of shell of boilers 24 inches diameter are single riveted. All girth seams and fire box seams are single riveted.

All boilers tested to 150 pounds hydrostatic pressure and made steam tight before leaving the works.

Prices upon application.

VERTICAL ENGINE.

Combined with Suitable Boiler.

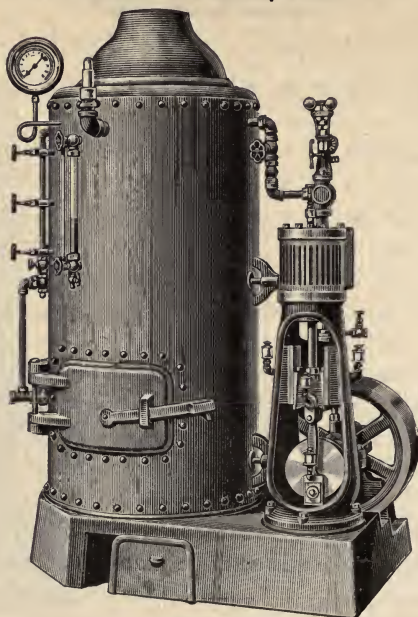


Fig. D. 841.

Horse-power	1½	3	5	7	10
Size of cylinder, inches.	3x3	4x4	5x5	6x6	7x7
Size of boiler, inches.	20x36	24x48	27x60	30x72	36x72
Number of 2-inch Tubes....	16	24	30	42	60
Height from floor to top of boiler.....	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
	3 8	4 8	6 9	6 10	6 10
Floor space required, inches..	22x33	27x40	31x47	36x55	42x66
Shipping weight, pounds.....	800	1600	2200	3000	4050
Price complete as shown.....	\$160 00	\$251 00	\$302 00	\$398 00	\$550 00

The complete outfit, as shown, includes the complete Engine fixtures, all necessary Boiler fixtures, with injector fitted and connections made between Engine and Boiler.

Exhaust-pipe and stack will be furnished when so desired at an extra cost.

Discount.

CHAIN.



Fig. D. 842.

Size, Ins.	Average Weight Per 100 Ft., Lbs.	Proof.			Size, Ins.	Average Weight Per 100 Ft., Lbs.	Proof.		
		Com- mon Lbs.	BB Crane. Lbs.	BBB Crane. In Lbs.			Com- mon Lbs.	BB Crane. Lbs.	BBB Crane. In Lbs.
$\frac{3}{16}$	50	700	800	950	$\frac{3}{16}$	590	13800	15500	17750
$\frac{1}{4}$	75	1200	1400	1600	$\frac{1}{4}$	700	16200	18000	21000
$\frac{5}{16}$	110	2500	3000	3350	$\frac{5}{16}$	780	18800	21000	24000
$\frac{3}{8}$	150	3500	4000	4500	$\frac{3}{8}$	890	21500	23750	27500
$\frac{7}{16}$	200	4800	5500	6300	1	1000	24600	27300	31350
$\frac{1}{2}$	250	6200	7000	8000	$1\frac{1}{16}$	1100	26300	30000	33500
$\frac{9}{16}$	315	7800	8800	10000	$1\frac{1}{8}$	1300	29500	32500	37500
$\frac{5}{8}$	400	9600	10750	12500	$1\frac{3}{8}$	1400	33000	36500	42000
$1\frac{1}{8}$	490	11500	12800	14750	$1\frac{1}{2}$	1500	36500	43000	46350

Common Proof Coil Chain.

This grade is made from first-class iron or steel, and welded by experienced workmen. It is good merchantable chain for general use.

B. B. Coil Chain.

This chain is made from extra quality of material, which will stand a tensile strain of 52,200 pounds per square inch, and all examined and tested before leaving factory. It is shorter in the link than common proof chain, and extra care is taken in welding the links.

B. B. B. Coil Chain.

This chain is made from refined and re-rolled material, which will stand a tensile strain of 53,800 pounds per square inch. It is very short in the link and extra care is taken in examining and testing it. This is a chain that can be depended upon.

Best Hand-Welded Dredge and Steam Shovel Chain.

It is made from a special refined and re-rolled tough and fibrous iron, which will stand a tensile strain of 54,500 pounds per square inch, and is only made by most skilled and experienced workmen. We can fully recommend this chain for all purposes where the best chain made is wanted.

Size.	Proof Test in Lbs.	Size.	Proof Test in Lbs.	Size.	Proof Test in Lbs.
$\frac{1}{8}$	1750	$\frac{1}{8}$	16150	$1\frac{1}{4}$	39500
$\frac{1}{4}$	3500	$\frac{1}{4}$	18500	$1\frac{1}{2}$	48500
$\frac{3}{8}$	4800	$\frac{3}{8}$	22000	$1\frac{3}{4}$	57750
$\frac{1}{2}$	6700	$\frac{1}{2}$	25000	$1\frac{7}{8}$	69500
$\frac{5}{8}$	9000	$\frac{5}{8}$	30000	$1\frac{15}{16}$	82500
$\frac{3}{4}$	11500	1	32850	$1\frac{1}{2}$	96500
$\frac{7}{8}$	13500	$1\frac{1}{8}$	36000		

Pocket Wheel Chains.

We are prepared to make all kinds of pocket wheel chains. In order to insure a perfect fit, the wheel over which the chain is to run should be sent us, otherwise we cannot guarantee a perfect fit. In cases where the wheel cannot be sent us, always furnish the inside length and width of link, and if for a steam shovel wheel themake and number of the wheel.

Prices upon application.

CHAIN.

Switch Chains.



Fig. D. 843.

Grab Hook on one end, Long Link on the other.

Any size to order, per lb.

Railroad Brake Chains.

All styles of brake chains made to order. Also safety and check chains.

Sling Chains.



Fig. D. 844.

Made in any length, and in any quality desired. Made also with either slip or grab hook in one end, and long link or ring in other end.

Rafting Chains.

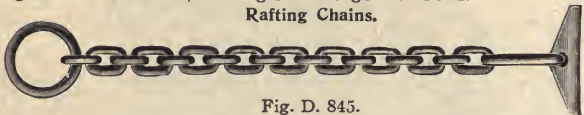


Fig. D. 845.

Made with toggle on each end; toggle on one end, ring in other end; and long link in each end. Also Coast Pattern Rafting Chain. Made in Proof, BB and BBB qualities.

Usual sizes, $\frac{1}{2}$ -inch, $\frac{3}{4}$ -inch, $\frac{7}{8}$ -inch, 1-inch, $1\frac{1}{8}$ -inch, $1\frac{1}{4}$ -inch. Any length desired. Prices upon application.

Steel Loading Chain.

We make a specialty of Steel Loading Chains. Made only by most experienced men, and it is of a uniform high quality.

Sizes carried in stock, $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{8}$

Other sizes made to order.

Derrick Chains with Steel Grab Hooks.

To lift tons.	Size of steel hooks.	Dist. "S." inches.	Length of chain feet.	Size of chain inches.	Price of two hooks without chain.	Price of hooks and chain complete.
2	$\frac{1}{2} \times 2\frac{1}{2}$	7	10		\$10 00	\$15 50
6	1 x 3	8	14		16 00	25 00
10	1 x 4	10	16		21 00	36 00
15	2 x 4	10	18		29 50	49 00
20	2 x 5	11	20	1	36 00	61 00

Loading chain made in BB.
BBB and Dredge quality chain

Discount.



Fig. D. 846.



Fig. D. 847.

CHAIN.

Chain and Clevis Hitchings for Mine Cars.



Fig. D. 848.



Fig. D. 849.

Usual size $1\frac{1}{2}$ inch Clevis, $\frac{7}{8}$ inch Links. All sizes made to order.
Made in proof, BB and BBB qualities.

German Coil Chain.



Fig. D. 850.

Number.....	6-0	5-0	4-0	3-0	2-0	1-0	1	2	3	4
American Gauge..	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	5	6	7	8	9	10	11
Weight per 100 ft.	52	46	36	32	27	23	19	13	11	9
List.....	\$18 00	15 50	13 00	11 00	10 00	8 80	7 80	7 20	6 80	6 60

Discount.....

Sash Chains.



Fig. D. 851.

Number.....	A	1	2	0
Per ft.....	13c.	10c.	8c.	6c.
For Sash.....	175 lbs.	125 lbs.	100 lbs.	60 lbs.

Discount.....

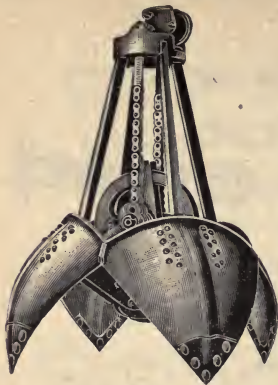


Fig. D. 852.

HAYWARD ORANGE PEEL BUCKETS

The Hayward Standard Orange Peel Bucket is a perfect digging bucket to handle all ordinary problems of dredging and excavating, and is also used for handling coal, dirt, gravel, mud, clay, grain, broken stone, etc. When closed, the blades, four in number, form a tight, semi-spherical bowl. The blades and blade arms are of flange steel and dig strongly and easily. The connecting rods are forged from a solid bar of steel, and the buckets are fitted with straight blade arms, allowing the maximum amount of clearance, both when the bucket is closed and closing.

Standard Orange Peel Buckets.

Capacity	Approximate Weight in Pounds	Closed		Open		Price
		Diameter Ft. In.	Height Ft. In.	Diameter Ft. In.	Height Ft. In.	
1 Cubic Foot	125	1 9	2 6	2 2	2 10	\$ 175 00
2½ Cubic Feet	450	2 6	3 9	3 2	4 3	250 00
5 Cubic Feet	900	3 2	4 9	4 0	5 4	450 00
7 Cubic Feet	1000	3 6	5 0	4 3	5 8	475 00
9 Cubic Feet	1100	3 10	5 2	4 8	5 10	500 00
12 Cubic Feet	2150	4 3	6 4	5 0	7 0	725 00
15 Cubic Feet	2350	4 6	6 6	5 6	7 3	775 00
21 Cubic Feet	3750	5 0	7 9	6 4	8 6	1000 00
1 Cubic Yard	4200	5 8	8 0	6 10	9 0	1050 00
1½ Cubic Yards	4750	6 0	8 3	7 3	9 6	1200 00
1¾ Cubic Yards	7750	6 4	9 6	8 0	10 9	1600 00
2 Cubic Yards	8500	7 0	10 0	8 6	11 3	1750 00
2½ Cubic Yards	9500	7 8	10 4	9 4	11 9	1950 00
3 Cubic Yards	10000	8 0	10 8	9 10	12 3	2150 00

Discount.....

Prices, photographs and specifications of other styles furnished upon request. The Hayward Standard Orange Peel Bucket is used for digging material of ordinary hardness. Where the material to be dug is more than ordinarily hard, we recommend Extra Heavy Standard Orange Peel Buckets. The parts of this bucket are heavier and stronger. Outside cast steel points may be added to the blade points, if ordered. These steel points are desirable where the material is sticky, material then having less tendency to stick to the blades.

All parts of these buckets are interchangeable and quickly renewable.

Other types of Hayward Orange Peel Buckets are Multi-power Buckets for digging clay, sand and extremely hard materials. Three-sided Orange Peel Buckets for the handling of boulders, broken rock and odd shaped materials.

HAYWARD CLAM SHELL BUCKET.



Fig. D. 853.

The idler sheaves are of manganese steel, removing all wear from the closing rope.

This bucket is equipped with the Hayward patented yoke chain which insures an even, constant closing power. It can be equipped with steel teeth when desired, giving it phenomenal digging power. If chain is desired for operating instead of wire rope, it should be stated in ordering.

The Hayward Class "E" clam shell bucket, equipped with ore bowl, is used chiefly in the handling of loose materials. The plate steel shoes extend to the top of the bowl, giving a remarkable cutting edge. The ore bowl, resembling a shovel in a way, permits the material to slide into the shell easily, insuring swift operation. It will handle all loose materials, but is particularly adaptable for rehandling crushed stone, broken slag, packed sand, ore and other difficult materials of like nature.

These buckets are chiefly constructed of forged steel; the connecting rods are of steel; the bearings are of hard bronze, the bolts and pins of Norway iron.

Class "E"—Clam Shell Buckets.

Capacity, Cubic Yards.	Approximate Weight in Pounds.	Open.						Price.
		Width, Ft. In.		Height, Ft. In.		Length, Ft. In.		
$\frac{1}{4}$	2100	3	3	5	10	5	7	\$ 600 00
$\frac{1}{2}$	2350	3	3	6	10	6	10	700 00
1	2600	3	3	7	8	7	6	800 00
$1\frac{1}{2}$	3800	3	9	8	6	8	6	950 00
$1\frac{3}{4}$	4000	4	0	8	6	8	6	1000 00
2	4750	5	0	8	6	8	6	1200 00
$2\frac{1}{2}$	5800	5	0	9	9	9	9	1450 00
3	6500	6	0	9	9	9	9	1700 00
4	9000	6	0	10	9	11	0	2250 00
5	11000	7	0	11	3	11	0	2800 00

Discount

Other types of Hayward clam shell buckets are Class "C" buckets, fitted with round link side chains specially adapted for handling all classes of loose materials. Class "H" clam shell buckets designed to handle heavier and rougher material than either Class "C" or Class "E" types with flat link side chains.

Prices, photographs and specifications on other styles furnished upon application.

In selecting proper sized buckets for work, the following weight of material will be found convenient:

A cubic yard of clay weighs.	3,000 pounds.	Soft Coal.	1,350 pounds.
Sand and Gravel.	2,700 pounds.	Loose Earth.	2,000 pounds.
Hard Coal.	1,600 pounds.	Concrete.	3,500 pounds.

KOPPEL AUTOMATIC BUCKETS.

Self-Dumping and Self-Righting.

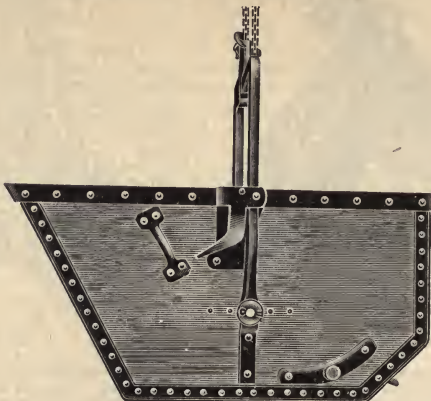


Fig. D. 854.

Capacity.	Top.	Bottom.	Depth.	Plate.	Weight.
42 cu. ft.	45½"x63"	45½"x36"	32½"	⅝"	835 lbs.

Other sizes in Chicago stock.

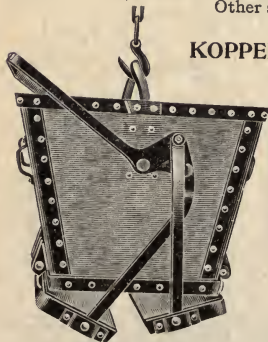


Fig. D. 855.

KOPPEL CENTER DUMP BUCKETS.

Operating device is simple, consisting of a few parts, which cannot clog or jam, all springs and slides eliminated, the lock being secure yet easily released.

The doors are tight when closed, having no openings to permit wet concrete or sand to leak out.

Great strength to stand the heaviest service.

The body is straight on two sides, the two other sides being slightly sloping, the corners are rounded to a large radius, doors open wide, and can by addition of chain and hook be regulated to any predetermined width of opening.

Door levers work on pivots, which are arranged so that when doors are closed they are securely locked.

Capacity.	Inside Dimensions.			Plate.	Weight.
	Top.	Bottom.	Depth.		
21 cu. ft.	2' 11½"x3' 6½"	2' 11½"x2' 4½"	2' 7"	⅝"	743 lbs.
27 cu. ft.	2' 11½"x3' 10"	2' 11½"x2' 6"	3' 0"	⅝"	962 lbs.
40½ cu. ft.	3' 6"x4' 6"	3' 6"x3' 0"	3' 2"	⅝"	1152 lbs.

Prices upon application.

ROUND BOTTOM TURNOVER BUCKET.

This bucket is well adapted for handling concrete or any other loose material in conjunction with a derrick and hoisting engine, where large quantities are to be placed. The side is of one sheet of steel, re-enforced with a heavy band at the top. The bottom is flanged up and an additional wearing plate is provided. The bail trunnions and stops are of forged steel. We furnish this bucket in all capacities for all conditions of service.

Prices upon application.



Fig. D. 856.

DROP BOTTOM BUCKET.

This bucket used extensively to handle concrete, etc., where the space between the forms is small and a tilting bucket would be likely to spill the batch over the sides.

Furnished in any size.

Prices upon application.

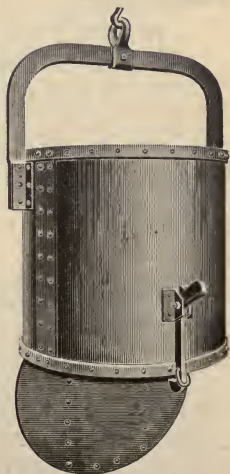


Fig. D. 857.

PORTABLE TRACK, SWITCHES AND CURVES.

Industrial Track. Steel Ties.



Fig. D. 858.

We make these in *sections of 15 feet each* for any gauge from 18 to 36 inches, *five ties with each section*. The sections are merely to be laid on the ground and coupled together, and the railroad is ready for traffic. Two men may carry a section anywhere, lift and relay entire system in a short time.

The rail is attached to the tie with a special bolt and clip. The clips are provided with lugs, which fit into the holes of the ties, preventing the possibility of the rails spreading and allowing the cars to derail. We supply for 12-pound rails, steel rolled ties weighing 7 pounds per yard; we supply for heavier rails, ties weighing 12 pounds per yard.

This kind of track is the very best for contractors, mines, quarries, or industrial plants, where it is necessary to move the track from one place to another.

Prices upon application.

Sections.



Fig. D. 859.

Connection of sections is performed by angle joints as shown in Fig. D. 859, or by plain joints. The angle joints are held in position and connected to the rail ends by two bolts, thus they form a socket which extends over the end of the rail and into which the rail end to be connected can be readily placed; they are secured to the tie by means of two additional bolts, which add to the strength of the joint and prevent the joints from becoming loose and the parts being lost while the track is being moved. A third bolt is supplied which can be used if the track remains permanent for any length of time.

Switches and Frogs.

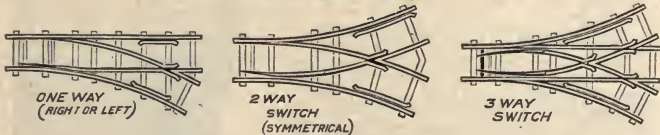


Fig. D. 860.

Illustrating standard turnout or switch attached to special tie.

These are made for any radius 12 feet to 30 feet, and for any gauge from 18 inches to 36 inches.

Gauge.	Style.	Radius	Length.
18-24 in.	R. H., L. H. or Three Way.	12 ft. 0 in.	9 ft. 0 in.
18-24 in.	R. H., L. H. or Three Way.	30 ft. 0 in.	15 ft. 0 in.
18-24 in.	Symmetrical or Two Way	12 ft. 0 in.	9 ft. 0 in.
18-24 in.	Symmetrical or Two Way.	30 ft. 0 in.	15 ft. 0 in.

We can supply permanent switches consisting of frogs, spring split switches switch points and ground throws, for any section of rail up to 60 pounds.

Prices upon application.

TURNABLES

For Industrial and Portable Track.

Koppel.

It is light and handy and can be moved about in the same manner as our portable track. The base is absolutely flat so that the turntable can be placed wherever required without necessitating a pit or any other preparation.

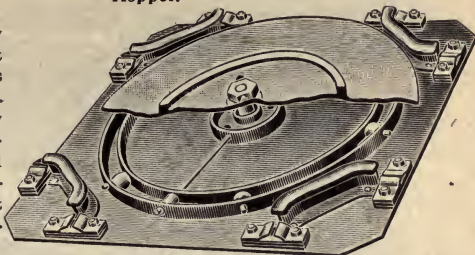


Fig. D. 861.

Size.	Gauge, Inches.	Diam., Inches.	Maximum Load, Tons.	Approximate Weight, Pounds.	Size.	Gauge, Inches.	Diam., Inches.	Maximum Load, Tons.	Approximate Weight, Pounds.
A	18	36	1½	280	F	24	44	1½	360
B	20	36	1½	270	G	20	48	1½-2	480
C	20	40	1½	310	H	24	48	1½-2	465
D	24	40	1½	300	I	30	48	2-2½	465
E	20	44	1½	380					

Prices upon application.

Universal.

Has patented automatic locking device; out of the way in using it.

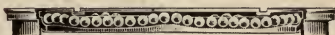
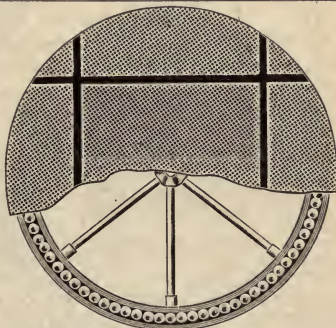
No necessity of rails cast on top. You level up the turntable to suit your rail.

Made for any gauge.

In ordering No. 2 turntables give gauge of track. In the absence of instructions, gauge is assumed to be inside of rails.

If the flanges of your wheels run on outside of track, so state.

Capacity, each, about 8 tons.



List Prices with Locking Device.

Fig. D. 862. No. 2.

Diameter.	For Gauge Track.	Weight.	Price.
3ft. 6 in.	18 to 24 inches.	760 lbs.	\$ 54 00
4 ft.	18 to 30 inches.	1,000 lbs.	62 00
5 ft.	18 to 36 inches.	1,265 lbs.	77 00
6 ft.	18 to 48 inches.	1,780 lbs.	102 00
8 ft.	48 inch and upwards.	3,430 lbs.	290 00

Discount

CRADLE DOUBLE SIDE STEEL DUMP CARS.

Koppel.

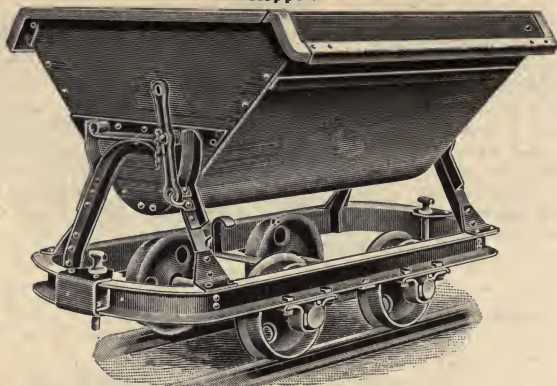


Fig. D 863.

Very strong, yet light; dump very easily and discharge contents clear of underframe and rails. Owing to the great dumping angle the box is completely emptied when dumped. The box can be placed in a slanting position to facilitate loading. We furnish steel wheels and roller bearings. Special channel steel round buffer frame.

The box is made of $\frac{1}{2}$ " best quality steel plates, flanged around the top to channel shape. The sides are re-enforced by angles where the box, when dumped, strikes the underframe.

The underframe is made of a special wide flanged $4\frac{1}{2}$ " channel steel section, bent round, thus forming an exceptionally strong center bumper. The wide flange of the channel allows a secure fastening of the bearings. A bumper plate is riveted over the ends of the channel frame.

Roller bearings are supplied with our cars. They reduce the power required to start and haul the cars by 30% and require practically no oil for lubricating.

Cast steel wheels are furnished on our cars. They are lighter, yet considerably stronger, than cast or chilled iron wheels. All wheels supplied by us have 3" tread.

Furnished in the following sizes:

Size	Capacity, Cubic Feet.	Gauge	Length Over All.	Width.	Height.	Diameter Wheels.	Approx. Weight, Pounds.
a	18	24"	5' 7"	4' 3"	3' 6"	12"	700
b	27	24"	6' 2"	4' 10"	3' 11"	12"	790
c	36	24"	6' 9"	4' 11"	4' 3"	14"	1045
d	36	30"	6' 9"	4' 11"	4' 3"	14"	1075

The standard gauge for cars up to 36 cubic feet capacity is 24," and we strongly recommend this gauge since it has proven the most adaptable, and material of this gauge is always kept in stock.

Cars of similar but heavier construction are made in sizes of two, three and four yards for 36" gauge, and four and six yards for standard gauge of $4' 8\frac{1}{2}"$.

Prices upon application.

STANDARD SCOOP DUMP CARS.

Koppel.

This car is especially designed for use in mines, excavations, tunnels and other service where small overall dimensions are an important factor on account of the usual small entries and sharp curves. The running gear is composed of either loose, tight or self-oiling wheels, roller bearings, and either square or round axles as may be desired. The wheels are standard cast-steel type, which, on account of their durability and toughness are of special advantage on small cars of light capacity. In order to secure a maximum capacity, the bodies are rectangular, they are fastened on the frame and running gear with a strong hinge.

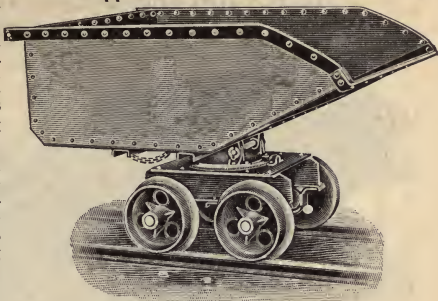


Fig. D. 864.

The hinge is located so that the body can be easily tipped to discharge the load.

These cars are especially made for hauling wet concrete and similar substance where it is desirable to have a tight car.

They are built without doors and the discharging ends are made in the shape of a scoop which gives a good condition for retaining the load for discharging when the body is tipped. These cars have a pressed steel turntable under the hinge so that they can be rotated before tipping, thus the load can be discharged to either end or either side.

One of the main advantages of this car is its ability to carry wet material without leaking.

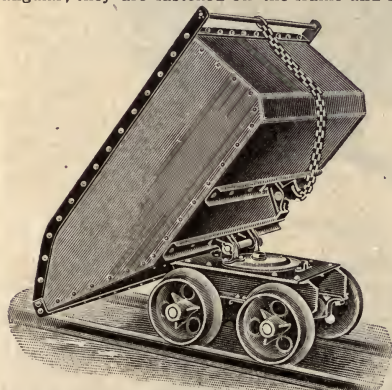


Fig. D. 865.

No.	Gauge, Inches.	Capacity, Cu. Ft.	Wheel.		Axle Diameter, Inches.	Wheel Base, Inches.	Dimensions of Box.			Height from Rail, Inches.	Square Axle.		*Round Axle.	
			Diam., Inches.	Tread, Inches.			Length, Inches.	Width, Inches.	Depth, Inches.		Plate, Inches.	W'ght, Lbs.	Plate, Inches.	W'ght, Lbs.
1	24	12	10	2½	1½	18	48	28½	17	33	¾	618	¾	673
2	24	18	10	2½	1½	18	61	28½	21	38	¾	678	¾	728

Other sizes kept in stock. Above dimensions are approximate only.

*We also furnish round axles and roller bearings for heavier service.

False bottom plates will be supplied to order. Prices upon application.

FOUR-YARD SQUARE BOX DUMP CAR.

Koppel.

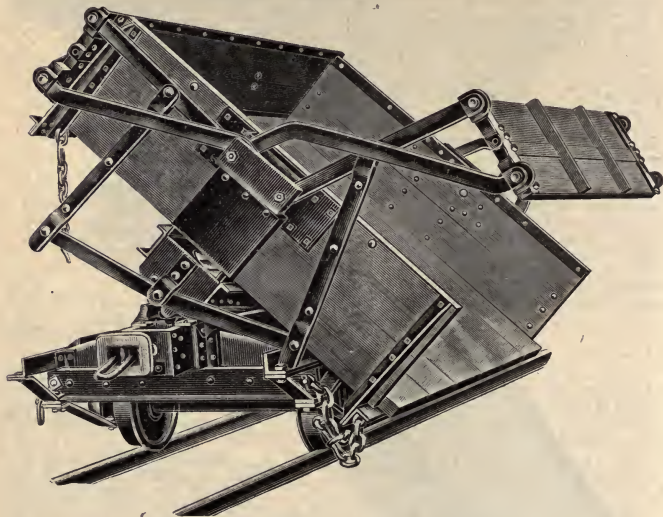


Fig. D. 866.

Dumping Position.

This car which is built for 36-inch gauge has the following advantages:

Total height only 5 feet 6 inches.

Large length (9 feet inside), and width (6 feet 11 inches inside), permits a long door opening which distributes the load better when dumping.

The car will carry a heaping load of over 6 yards on account of its large length and width.

The underframe is made entirely of steel.

With exception of the wheels, which are made of chilled iron, the journal boxes, made of malleable iron, and the wooden box, all parts are made of steel.

The dumping angle is 45 degrees.

Long side throw, so that no material is dumped near the rails.

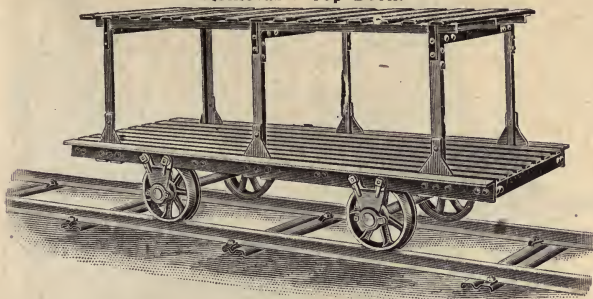
Very strong construction.

Large quantities of these cars are kept in stock.

Prices upon application.

Note

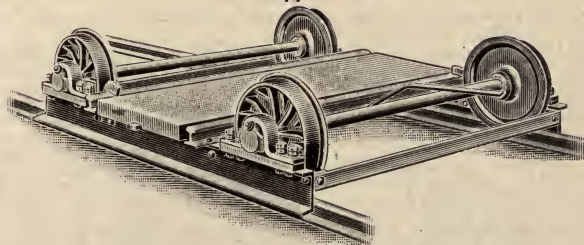
We are in a position to submit prices on any industrial railway material and special cars up to 100-ton capacity, electrically driven cars, electric locomotives, etc. We also carry a full line of the Koppel line, as shown herein, in different parts of the country and are, therefore, in position to make very prompt delivery. Inquiries solicited.

KOPPEL DOUBLE DECK BRICK CAR.**Removable Top Deck.****Fig. D. 867.**

The side bars of frame are made of $3 \times 2\frac{1}{2} \times \frac{1}{4}$ -inch angles, riveted to four cross braces of angle steel, $2 \times 1\frac{1}{2} \times \frac{1}{4}$ inch, with angle clips. Each cross piece is secured to side bar by rivets. Wheels $10\frac{1}{2}$ inch diameter, made of cast iron; axles $1\frac{1}{2}$ inch diameter, made of special axle steel.

Length Over All.	Width Over All.	Length of Top Deck.	Width of Top Deck.	Height of Top Deck.	Height of Bottom Deck.	Weight, Lbs.
6 ft., 11 in.	2 ft., 11 in.	6 ft.	2 ft., 11 in.	3 ft.	1 ft., 1 in.	500

Other styles and sizes in Chicago stock. Prices upon application.

TRANSFER CAR.**Koppel.****Fig. D. 868.****Single.**

Gauge Transfer Car.	Gauge Top Track.	Width.	Length.	Height from Top of Rail to Top of Rail.	Weight, lbs.
4 ft.	24-26 in.	5 ft.	5 ft. 5 in.	$6\frac{1}{4}$ in.	660

We can also furnish transfer car with a double track.

Special cars, either single or double track, can be furnished for any gauge or capacity desired. Prices upon application.

CONCRETE MIXER.

The Smith.

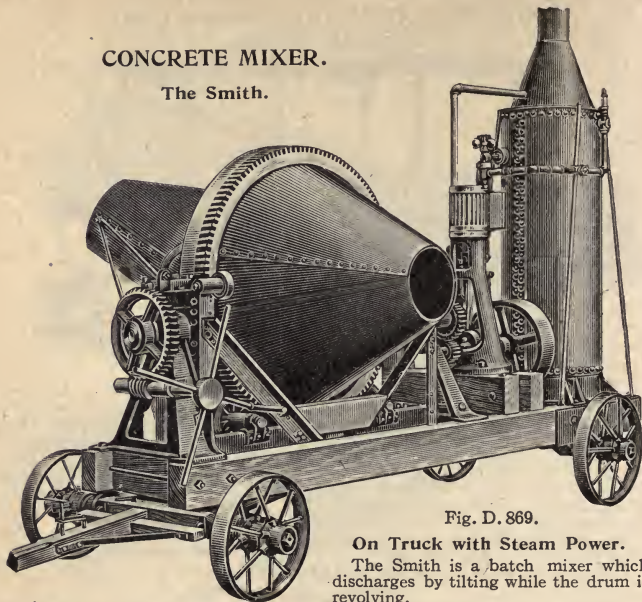


Fig. D. 869.

On Truck with Steam Power.

The Smith is a batch mixer which discharges by tilting while the drum is revolving.

Can be furnished with steam engine only, gasoline engine or electric motor, or with belt pulley, on skids or trucks.

The machine consists of a drum of double conical form, supported and guided by the frame. The unmixed materials are fed in at one end of the drum and when thoroughly mixed are discharged at the other end by tilting the drum while running at full speed. The interior of the drum is provided with rigid blades arranged in sets, each set forming a single spiral. The alternate sets are of reverse winding and overlap each other in the middle of the drum.

Size Number	No. 0	No. 1	No. 2	No. 2½	No. 4	No. 5
Standard charge { Cement	1	1	2	2	3	4
cubic feet.... { Sand	2½	4	6	7½	10½	14
{ Stone	5	8	12	15	21	28
Total unmixed per batch	8½	13	20	24½	34½	46
Mixed material per batch (loose)	6	9	13½	16½	22	30
Cubic yards mixed per hour, up to	9	20	30	39	46	62
Power required—H. P.	4	6	8	10	15	19
Revolutions per minute of driving pulley	218	180	173	162	160	125
Diameter and face of driving pulley	20x4½	24x5½	28x5½	28x6½	36x6½	48x7½
Weight on skids with pulley only	1,600	2,500	3,800	4,500	5,600	7,300
Weight on truck with pulley or gears	2,100	3,000	4,400	5,500	.....	.....
Weight on truck with steam engine and boiler	3,100	5,000	7,400	8,400	.....	.....
Weight on truck with gasoline engine	3,600	5,000	7,000	8,500	.....	.....

Prices upon application.

CONCRETE MIXER.

The Eclipse.

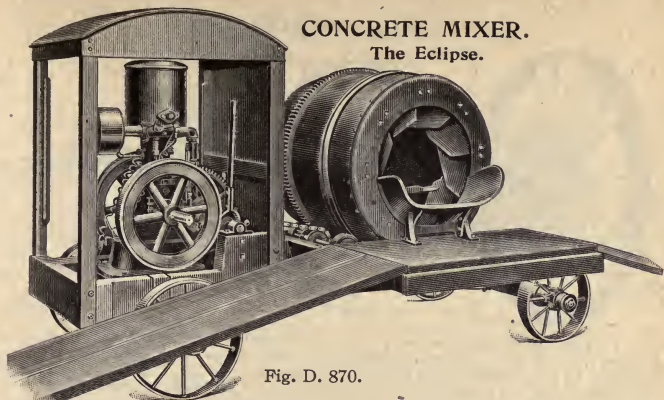


Fig. D. 870.

The Eclipse low charging platform is only about 2 feet high, allowing the use of plank runways for wheelbarrows. No expensive charging apparatus, requiring hoisting equipment. The large opening in the drum enables the operator to keep the mix always in plain sight. The mixing blades are so arranged as to mix the materials as quickly as possible. This gives the machine great capacity, for there are no lost motions—every revolution of the drum counts. The discharging apparatus may be operated from either side of the drum—it acts semi-automatically. Cleans itself. Does not stop. Has quick discharge. Its weight permits it being hauled over rough and uneven ground. The open drum and low charging platform permit the batch to be shoveled directly into mixer. One wheelbarrow load or the entire batch may be dumped at once without tilting the drum or stopping the engine. A simple, durable, reliable rapid mixer.

NUMBER.....	103	105	108	111	115	121	130	140
Maximum capacity per batch unmixed, cu. ft.	3	5	8	11	15	21	30	40
Approximate charge per batch cement, cu. ft.	$\frac{1}{3}$	$\frac{1}{2}$	1	1	$1\frac{1}{2}$	2	3	4
Approximate charge per batch sand, cu. ft....	1	$1\frac{1}{2}$	2	3	$4\frac{1}{2}$	6	9	12
Approximate charge per batch stone, cu. ft....	2	3	4	6	9	12	18	24
Est'd cap. per batch mixed concrete, cu. yds..	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Est'd cap. per hour mixed concrete, cu. yds...	3	5	8	11	15	20	25	30
Horse power required.....	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	5	7	10	14
Horse power furnished gasoline.....	$2\frac{1}{2}$	3	5	5	5	9	..	..
Horse power furnished steam engine.....	2	2	4	5	6	8	12	15
Horse power furnished steam boiler.....	3	3	5	6	7	9	14	16
Revolutions per minute.....	16	16	16	15	14	14	13	13

We can furnish these mixers on skids or trucks with pulley or gear (no power) with gasoline engine, housed; with steam engine only; with steam engine and boiler or with electric power. Please advise size of mixer and kind of power desired.

Wood trucks carried in stock and furnished regularly. For steel truck or skid add 10% of price without power. Friction clutch or tightener drive included with gasoline engine outfits only. All mixers mounted for side discharge unless otherwise specified. Mounted on trucks for rear discharge when so ordered, add \$30.00. Water tanks and connections for supplying water to mixer, add \$30.00. When furnished on truck, pole only is included. Double tree and neck yoke extra, add \$5.00. When ordering with electric motor give voltage and whether direct or alternating current and if alternating current give phase and cycle.

Prices upon application.

CONCRETE SPREADER CART.

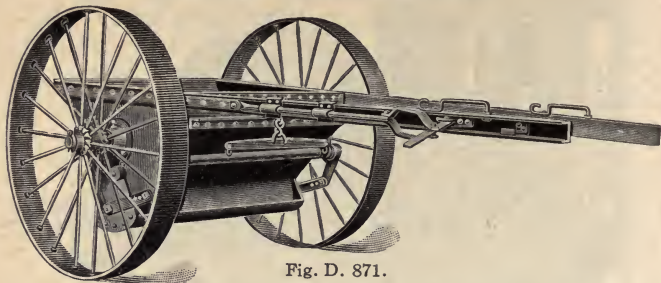


Fig. D. 871.

This indispensable vehicle for use in street paving is the most improved cart now on the market. Large, wide-tired wheels, turning on heavy axles that are attached to sides of the body and do not pass through it. Discharge is effected by movement of the radial door in the bottom, controlled by operation of the lever attached to shaft. The radial door prevents leakage, and can be opened so as to discharge any desired quantity of material. The body is so shaped that "bridging" of concrete is avoided and the cart is nicely balanced. Capacity, 19 cubic feet.

Weight, 1,200 lbs., price, each.....\$135 00.

Discount.....

STEEL CONCRETE CART.

There is an important economic advantage in being able to discharge the batch from a concrete mixer in much less time where carts are used than where wheelbarrows are used. A mixer can be discharged into these carts in one-third the time required with wheelbarrows.

The bottom and ends of the bowl are formed from one continuous sheet of steel. The sides are stamped with a flange and riveted to the bottom and ends. Heavy bands stiffen the edges. Protection for the lip of the bowl in dumping is afforded by the heavy rigid band which traverses it.

All weight is distributed well along the axle by cast iron axle bearings secured to the sides of the bowl. *The axle passes around instead of through the body.* The cart will clear itself of any kind of material both quickly and completely, being spared much of the banging and rough handling in dumping which soon destroy less aptly designed carts. Legs are stationary.

Oilless wood bushings in the hubs ensure a constantly good running condition with no attention. Hubs are capped to exclude dirt from the bushings.

Weight, 196 lbs. Price, each.....\$30 00

Discount.....

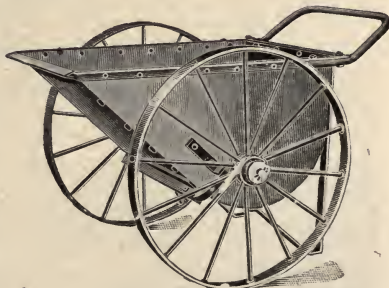


Fig. D 872.

Capacity 6 Cubic Feet.

CONCRETE TOOLS.**Vaughan's Patent Concrete Spade.**

Fig. D. 873.

By use of Vaughan's patent concrete spade, you can force the coarse aggregates in the concrete back, while the forms are still about the wall, and let the finer cement mortar flow forward, the perforations in the spade allowing it to come to the front. Your wall is thus given a smooth finish, without applying face mortars.

D Handle, per doz.....\$30 00
Long, Straight Handle, per doz..... 30 00

Discount.....

**Concrete Spade.
Ross.**

Fig. D. 874.

Another style of concrete spade, designed to force the stone back from the form, producing a white, clear, smooth surface. The long slope of the cam projections enables the spade to be inserted easily, requires but little power to push the stone away from the form face, and does not disturb surface when withdrawing the blade. Price, per doz.....\$30 00

Discount.....

**Concrete Tamper.
Andrews.**

Fig. D. 875.

The tamper is eight inches square, divided on its face with pyramidal projections, as shown in the accompanying illustration. These projections are connected at their bases in such a way as to prevent particles of stone from becoming wedged between them. For use, after the layer of concrete has been spread and roughly leveled with the customary straight edge; the workman proceeds to tamp, with the result that the freer sand, cement and water come to the surface, leaving the latter in such a condition that it may be smoothed off with a float or trowel, substantially as the separately applied finish layer is smoothed off or finished, according to the present practice.

It has two very decided advantages over any other form of concrete tamper.

The advantage of getting a homogeneous mass, which does not have the liability of separation in layers as is the case of two separate layers, being placed at different times, and the advantage of finishing floor or any horizontal surface work at one time, without running two mixing gangs.

These advantages mean economy and efficiency. Price, per doz.....\$24 00

Discount.....

CONCRETE RE-ENFORCEMENT BARS (Deformed).

Havemeyer Bars.



Fig. D. 876.
Square Bar.



Fig. D. 877.
Round Bar.

CONCRETE CONSTRUCTION.

The art of re-enforced concrete construction has advanced beyond all expectations, and it can be safely said that there is no important architectural or engineering development that does not use re-enforced concrete in some part of the construction.

The uses of re-enforced concrete as a building material are greater than those of any other known material. It not only takes the place of brick in the walls, the structural steel in the columns, beams and floors, but provides the wearing surface of the floor itself.

The question of its fire-resisting qualities has long been settled. Such severe tests as the Baltimore and San Francisco fires prove that as a fireproofing material it has no equal.

The use of re-enforced concrete in all great government, state, municipal, and railroad work, gives us ample proof of its economy, safety, permanence and adaptability.

In a re-enforced concrete structural member, the re-enforcement provides for stresses in tension and assists in shear, while the concrete provides for the stresses in compression, the efficiency depending upon the concrete and steel acting together. All stresses are put into the steel through bond action. Laboratory tests frequently

show that plain bars have considerable grip in concrete, but other practical and theoretical tests have shown that where the concrete is soaked in water, as in most foundations; where vibrations and shocks occur, and where floors have been subjected to repeated loading, the adhesion has been greatly reduced, and in many cases the bond broken. The deformed bar eliminates this defect, and has a positive mechanical bond independent of adhesion.

HAVEMEYER BARS.

The Havemeyer bar has been designed to meet the requirements of bond, and at the same time the important economical requirement that in the deformation no strength or metal is wasted.

Uniform Cross-section.

The deformations of the Havemeyer bar are designed so that a constant cross-sectional area is maintained. The square bar has a series of projections and depressions in conjunction with the plain square section of the bar, the projections on the sides equaling the depressions on the corners. The round bar has projections staggered on alternate faces, giving the same result, and no metal is wasted to secure the strongest grip in concrete.

Uniform Strength.

The projections and depressions are rolled longitudinally with the bar, there being no sharp angles to form points of weakness in the steel, and the full tensile strength of all the metal is developed at every point.

Mechanical Bond.

The irregularities or deformations on the bar offer more than sufficient resistance or mechanical bond in the concrete, and form a perfect bond, independent of surface adhesion.

Tests have shown that Havemeyer bars develop maximum efficiency, and will not slip or pull out of the concrete.

Havemeyer bars will not split the concrete, will not twist or turn under stress, and have no sharp edges to start a fracture in the concrete.

A bond test for Havemeyer bars was recently made under the supervision of Prof. Talbot of the University of Illinois and quote herewith from Prof. Talbot's

report on these tests:—"The advantage generally claimed for deformed bars is that they are safe-guarded against failure at small movement of bar. The results compare favorably with other deformed bars. Respectfully submitted A. N. Talbot."

Cold Bending.

Havemeyer bars will bend cold easily and accurately. The longitudinal deformations allow of no weak points to start fractures. The metal in the projections follows the bend as readily as the metal in the main portion of the bar.

On the round bar, the four longitudinal ridges form a guide to keep the several bends in the same plane, which greatly assists the contractor.

Quality of Steel.

Havemeyer bars can be rolled from any merchantable quality of steel. Unless otherwise specified Havemeyer bars will be rolled from a high-grade, new billet steel, having an elastic limit of 50,000 to 65,000 pounds per square inch.

Quantity of Steel.

Havemeyer bars have the same net sectional area, and the same gross weight as plain bars of the same nominal size.

Advantages Over Other Bars.

Most other types of deformed bars have a certain amount of metal which is placed in cross-ridges for the sole purpose of securing a mechanical grip in concrete. This metal does not enter into the tensile strength of the bar, and thus necessitates rolling the bars over-weight in order to secure the required sectional area. The purchaser, therefore, is obliged to pay for this extra metal.

The Havemeyer round and square bars are unique in this respect, as the projections and deformations enter directly into the tensile strength of the bar and no metal is wasted. The contractor will use the same amount of steel when using Havemeyer bars as if plain bars were used.

Compare the weights per foot for each size of Havemeyer round or square bars with the weights of competitive bars.

CONCRETE RE-ENFORCEMENT BARS—Continued. **Havemeyer Bars.**

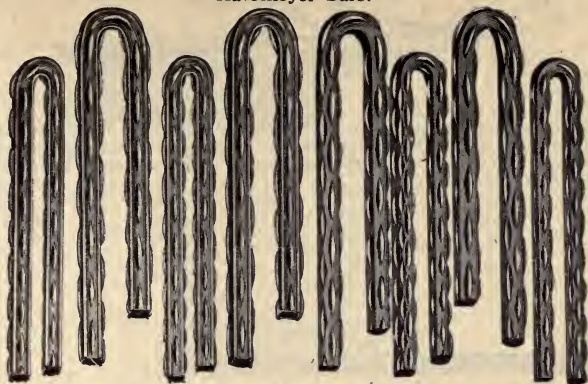


Fig. D. 878.

Round and Square Bars Bent Cold.

Havemeyer SQUARE Bars are rolled to the following areas and weights.			Havemeyer ROUND Bars are rolled to the following areas and weights.		
Size.	Area.	Weight per foot.	Size.	Area.	Weight per foot.
$\frac{1}{8}$ inch	0.0625	0.212	$\frac{1}{8}$ inch	0.1104	0.375
$\frac{1}{4}$ inch	0.1406	0.478	$\frac{1}{4}$ inch	0.1963	0.667
$\frac{3}{8}$ inch	0.2500	0.850	$\frac{3}{8}$ inch	0.3068	1.043
$\frac{1}{2}$ inch	0.3906	1.328	$\frac{1}{2}$ inch	0.4418	1.502
$\frac{5}{8}$ inch	0.5625	1.913	$\frac{5}{8}$ inch	0.6013	2.044
$\frac{3}{4}$ inch	0.7656	2.603	1 inch	0.7854	2.670
1 inch	1.0000	3.400	$1\frac{1}{8}$ inch	0.9940	3.379
$1\frac{1}{8}$ inch	1.2656	4.303	$1\frac{1}{4}$ inch	1.2272	4.173
$1\frac{1}{2}$ inch	1.5625	5.312			

Important.—Compare the above areas and weights with those of competitors.

Extras are given in Cents per Pound.

Rounds and Squares.

$\frac{1}{8}$ to $1\frac{1}{8}$ inches.....Base	$\frac{1}{8}$ inch.....\$0 25 extra
$\frac{1}{4}$ inch.....\$0 05 extra	$\frac{1}{4}$ inch.....50 extra
$\frac{3}{8}$ inch.....10 extra	

Quantity Differentials.

<p>All specifications for less than 2,000 pounds of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of exact quantity actually shipped.</p> <p>Quantities less than 2,000 pounds, but not less than 1,000 pounds....\$0 15 extra</p> <p>Quantities less than 1,000 pounds.....35 extra</p>	
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Extras for Cutting to Specified Lengths.

Hot Sawing or Shearing to lengths over 24 inches.....\$0 05 extra	
Hot Sawing or Shearing to lengths 12 inches to 24 inches, inclusive... 10 extra	
Hot Sawing or Shearing to lengths under 12 inches.....15 extra	

Exceptions.

No charge will be made for hot sawing or shearing to lengths of 5 feet and over

ASPHALT TOOLS.

Rakes.

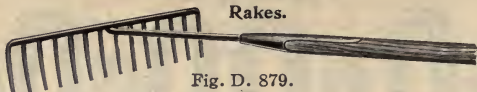


Fig. D. 879.

These rakes made purposely to work in asphalt and tar. The teeth, head and shank are forged from one solid piece of steel. The long shank prevents the handle from burning. The straight head serves to level the asphalt preparatory to tamping. Strap or common ferrules as ordered. For common ferrules deduct \$1.50 from the list prices.

No.	Number of Teeth.	Shank.	Length, Handle.	Price, Doz.
1	14	Square, 18 in.	5 feet, wood	\$28 50
2	14	Square, 18 in.	5 feet, wood	26 50
3	14	Round, 18 in.	5 feet, wood	26 50

Discount.....

"Jumbo."

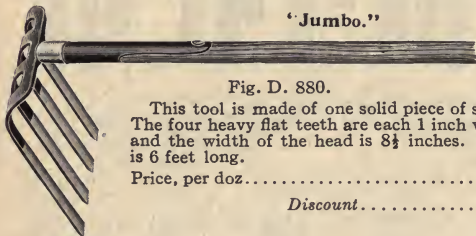


Fig. D. 880.

This tool is made of one solid piece of steel, and is very strong. The four heavy flat teeth are each 1 inch wide and 11 inches long, and the width of the head is 8½ inches. The heavy ash handle is 6 feet long.

Price, per doz.....\$24 25

Discount.....

Hoes.

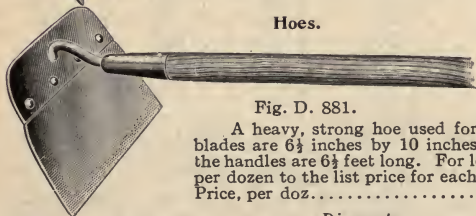


Fig. D. 881.

A heavy, strong hoe used for mixing asphalt. The blades are 6½ inches by 10 inches with solid shanks and the handles are 6½ feet long. For longer handles, add \$1.50 per dozen to the list price for each additional 6 inches.

Price, per doz.....\$25 15

Discount.....

Patching Hoe.

The blade is made of No. 10 steel; 10 inches wide; 8½ inches high, having stamped teeth on one side, 1 inch pitch by 1 inch deep. The other side is painted.

Handle made of ¾-inch wrought iron pipe, welded to wrought iron crow feet which

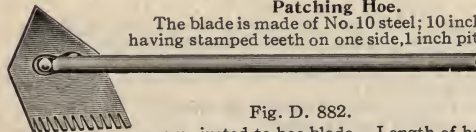


Fig. D. 882.

are riveted to hoe blade. Length of handle, 7 feet 10 inches, weight, 11 lbs.

Price, each.....\$2 75

Discount.....

ASPHALT TOOLS.**Smoothers.****Fig. D. 883.**

Made of cast iron, being ground smooth and to a curve. Provided with 1½-in. pipe handle bent at the end, and with steel-stud cast in head to which handle is welded. Made in two sizes.

Size 14½ x 7½ inches, weight, 60 lbs., price, each.....\$3 75

Size 10½ x 6½ inches, weight, 46 lbs., price, each.....3 00

Discount.....

Tampers.**Fig. D. 884.**

Made of cast iron, with handles welded to wrought iron stub cast into shoe.

Size of Shoe.	Weight.	Price, Each.
8 in. x 6 in.....	30 lbs.	\$2 25
8 in. x 8 in.....	40	2 50
6 in. x 6 in.....	25	2 10
5½ in. x 2½ in.....	15	1 80

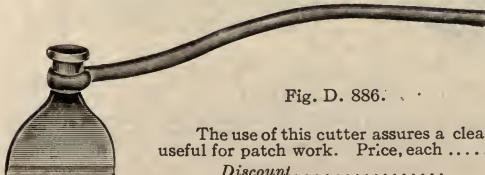
Discount.....

**Cutters.
Double Eye.****Fig. D. 885.**

Are made of tool steel, with tempered edges, so made in order that when the cutter wears away at one corner, it may be turned on the handle, thus giving much longer service before the tool has to be repaired. Length of cutter from edge to edge 20½ inches; width of edge 3 inches, no handle.

Weight, 11 lbs., price, each.....\$1 50

Discount.....

Handled Cutter.**Fig. D. 886.**

The use of this cutter assures a clean, straight cut. Very useful for patch work. Price, each.....\$4 00

Discount.....

ASPHALT TOOLS.
Sandals.



Fig. D. 887.

Made of extra heavy stock sole leather and are 13 $\frac{1}{4}$ " long by 7 $\frac{1}{4}$ " wide, having round corners, fitted with metal heel plates securely riveted to sole, leather straps securely attached to sandal.
Weight per doz., 33 lbs., Price per doz. pair . . . \$24 00

Discount

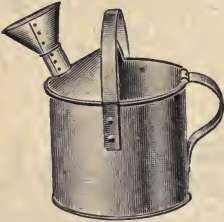


Fig. D. 888.
Pouring Pot.

POTS.
Rolled Seams.
No Soldering.

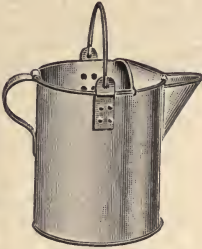


Fig. D. 889.
Melting Pot.

All seams throughout are rolled, no solder being used. Made of heavy galvanized iron and have bale and spout for heavy material. Also used by contractors for filling joints in brick paving work and for spreading hot oils in state road construction; also by roofers.
Pouring Pot, weight 10 lbs., price, each \$3 50
Melting Pot, weight 8 lbs., price, each 3 00

Discount

HAND ROLLER.

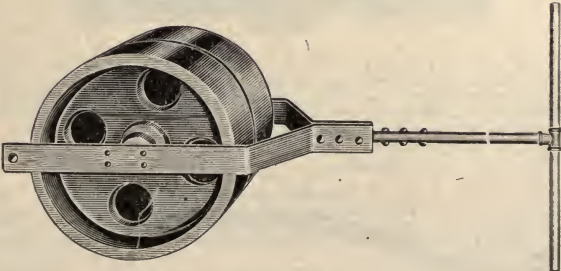


Fig. D. 890.
Weight 1,000 Lbs.

Roll is made of cast iron, in two sections, face turned true; mounted in heavy steel frame, provided with bronze bearings. To the frame is attached a long pipe handle, made in sections.
Price upon application.

ASPHALT FIRE WAGON.

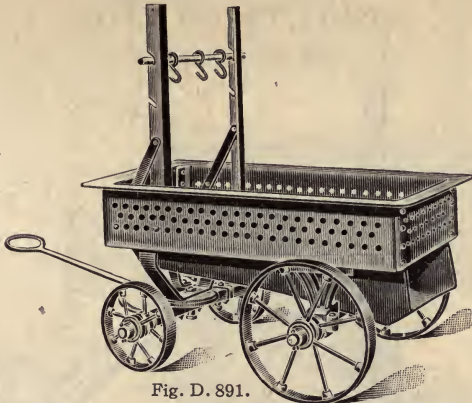


Fig. D. 891.

Body of wagon is perforated and is supported on axles and steel wheels of heavy truck type and is provided with strong steel handle. The body is made of $\frac{1}{2}$ -inch tank steel, having a $3\frac{1}{2}$ -inch flange at the top. Is fitted with sloping ash pan to facilitate cleaning. Removable grates are arranged in sections and can be replaced readily.

Length of Body.	Width of Body.	Depth of Body.	Weight.	Price, Each.
5 ft. $1\frac{1}{2}$ in.	2 ft. $6\frac{1}{2}$ in.	1 ft.	1430 lbs.	\$110 00

Discount.....

ASPHALT SURFACE HEATER.

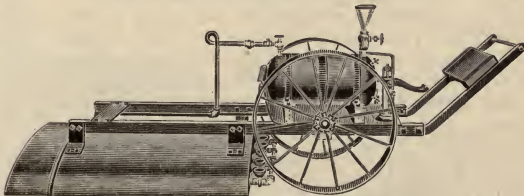


Fig. D. 892.

Are made with hood 4 feet wide, 5 feet long, having five 2-inch burners. The frames are of 3-inch channel supported on suitable axle and steel spoke wheels, 30 inches diameter. The fuel tank is of 20 gallons capacity, provided with suitable brass air pump, pressure gauge, the necessary valves and metal funnel for filling. The extended handle is provided with counterweight to counter-balance the weight of the hood and burners. Weight, 636 lbs., price.....\$160 00

Discount.....

ASPHALT HEATING KETTLE.

400 Gallon Capacity.

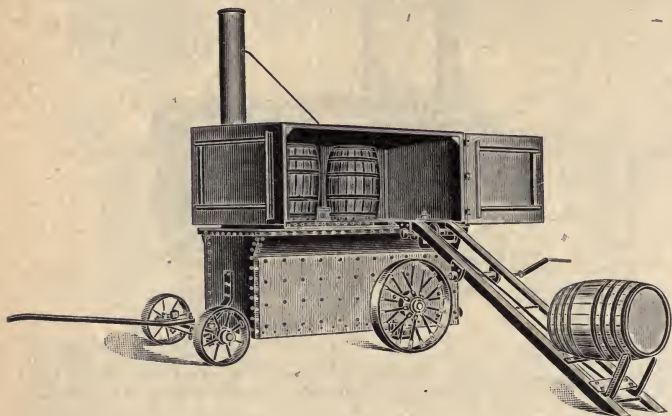


Fig. D. 893.

Designed especially for use in road construction where bituminous binders are used. Extreme dimensions: Height, 10 feet; length, 8 feet; width, 5 feet. Rack holds six barrels. Furnace under whole length of kettle; no grates. Double hood doors. Heavy steel wheels and axles. Skids for quick and easy loading. Inside draw-off valve. Hood made of No. 16 stock.

Among other advantages of this heater, the tank of No. 10 wrapping steel is a unit in itself, and when same is burned out it is only necessary to replace this part. Fire-box is big enough to heat material quickly. The hood retains heat around barrels while in the rack. In these and other features the design of this kettle avoids all defects of heaters heretofore available.

Weight.	Dimensions.			Price.
	Length Over All.	Height.	Width.	
4,300 lbs.	15 ft. 6 in.	7 ft. 4 in.	7 ft. 3 in.	\$450 00

Discount.....

Grate for burning coal. \$15 00 net extra.

PORTABLE HEATING KETTLE.

Substantially built of No. 14 sheet steel, thoroughly riveted and braced in all corners with angle iron. Tank is made with bottom semi-cylindrical in form, separate from fire-box, thus facilitating repairs in replacing burnt bottoms. Furnace is re-enforced on the inside by an extra thickness of No. 14 steel to resist furnace heat.

Is equipped with two steel wheels 48-inch diameter, 4-inch rim with iron spokes. Wheels are mounted on a heavy steel axle, fastened securely to bottom of kettle. Tongue riveted to tank at the proper height for hauling, and with wrought iron rest provided with foot.

Also made without wheels or tongue, with four handles riveted to side sheets.

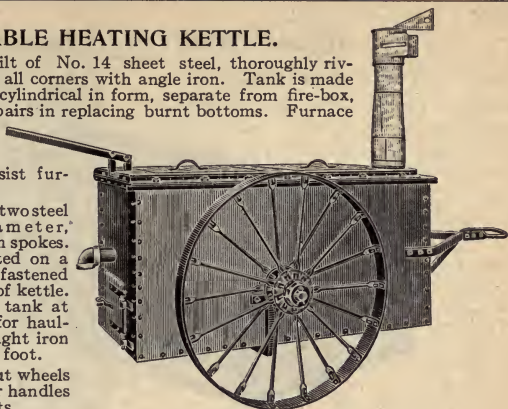


Fig. D. 894.

50, 100 and 150-Gallon Capacity.

Capacity.	Height.	Length.	Width.	Portable.		Stationary.	
				Weight.	Price.	Weight.	Price.
50 gallons	27 inches	46 inches	25 inches	650 lbs.	\$100 00	300 lbs.	\$50 00
100 "	28 "	59 "	32 "	750 "	110 00	400 "	67 00
150 "	36 "	75 "	32 "	910 "	125 00	560 "	80 00

Discount

PORTABLE ASPHALT AND TAR KETTLE.

Are made elliptical in form, of $\frac{1}{2}$ -inch tank steel, riveted to heavy angles at the top and bottom and are made in 100-gallon capacity.

General dimensions: length 44 inches; width 33 inches; depth 30 inches.

The kettle is equipped with cast iron grates.

The asphalt tank is made of same material as kettle and is supported by angles; tank dimensions being $27\frac{1}{2}$ inches wide by 38 inches long by 28 inches in depth; bottom is of cast iron having raise in center and properly ribbed to prevent warping, and is riveted in.

Weight, 1,420 lbs. Price.....\$150 00

Discount

Can also furnish in larger or smaller capacity. Write for discount.

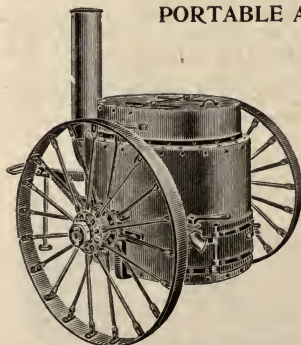


Fig. D. 895.

100-Gallon Capacity.

ASPHALT AND TAR KETTLES.

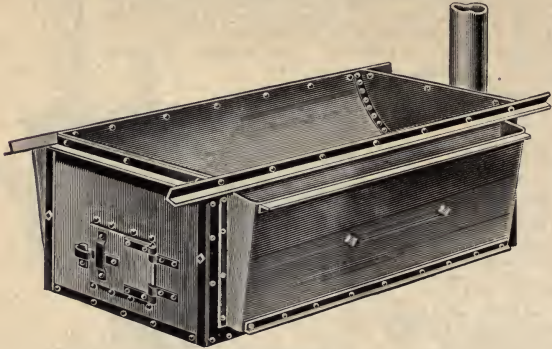


Fig. D. 896.
Capacity 100 Gallons.

Made of heavy black steel, securely braced with angle iron. Tank can be lifted out. The sides and ends are bolted together and can be knocked down for shipment or removal from one job to another or for cleaning fire on ground. Note pockets on side for heating sand or gravel.

Capacity, 100 gallons, price.....\$60 00
Discount.....

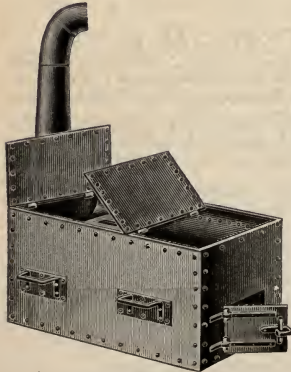


Fig. D. 897.
No. 1—45 Gallon Capacity.

Another style of Asphalt or Tar Kettle with covers. Is built of heavy steel with bottom of tank made of No. 12 stock. Well braced with angle iron on all sides, top and bottom. Fire on ground.

Sand pockets for heating sand or gravel. Can also be made for these kettles at a reasonable price.

No.	Capacity.	Price, Each.
1	45 gallons	\$45 00
2	75 "	50 00
3	120 "	60 00

Discount.....

Larger sizes on short notices.

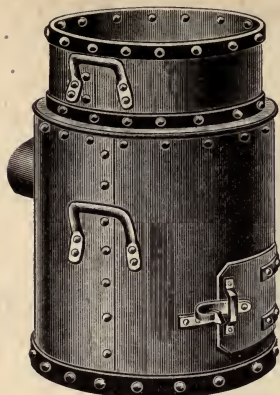


Fig. D. 898.
No. 2. 70 Gallon Capacity.

Round Tar Kettle with Tray.

This style kettle equipped with tray for bridge work or small patch jobs. Also equipped with pockets for heating gravel.

No.	Capacity.	Price.
1	20 gallons	\$40 00
2	70 gallons	50 00
3	125 gallons	65 00

Discount.....

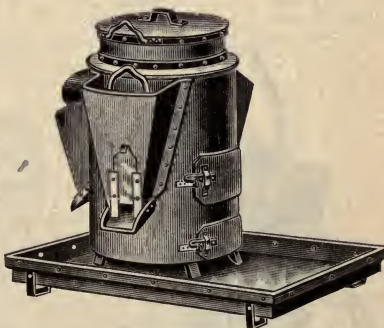


Fig. D. 899.
No. 1. 20 Gallon Capacity.

Dipper.

Made of double annealed steel with Norway iron trimmings, closely riveted. Handle is riveted and brazed. Made in two grades.

Capacity.....	7 quarts
Price, each (like cut).....	\$2 50
Price, each (second grade).....	1 60



Fig. D. 900.

Discount.....

ROOFERS' TAR PAILS.



Fig. D. 901.
Carrying Pail.



Fig. D. 902.
Hoisting Pail.

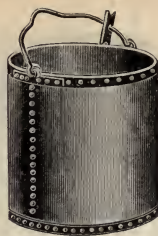


Fig. D. 903.
Mop Pail.

Pails have convexed bottoms so as not to stick or cut felt, etc. Made in two grades. The second grade pails are machine seamed; are lighter in weight, but are strongly built with Norway iron bars and heavy bail and band.

Style.	Capacity.	Price, Each. (Like Cuts.)	Price, Each. (Second Grade.)
Carrying pail.....	5 gallons	\$3 00	.....
Hoisting pail.....	6 gallons	4 00	\$2 75
Mop pail.....	10 gallons	4 50	3 00

Discount.....



Fig. D. 904.

These pay off pails made of heavy galvanized iron, and will answer the purpose where pitch is not heated to a high degree. Flat or round spout furnished.

Price, each.....\$3 00

Discount.....

Pay off Pail.

Made of heavy black steel, raised bottom, bands on top and bottom. Swing handle. All joints closely riveted and brazed. Can be burned out when clogged or coated, without injury. Spouts interchangeable.

Pail, with either spout, price,
each.....\$5 00
Extra spouts.....1 00

Discount.....



Fig. D. 905.

ROOFERS' HOISTING BEAMS.



Fig. D. 906.

Made of best grade hickory. Well ironed. Roller bearing wheel.

Price.....\$20 00

Discount.....

SALAMANDERS



Fig. D. 907.

For drying out new buildings, etc. Body 16 inches diameter, 15 inches high. Total height 30 inches. Heavy steel-band legs, rounded under pan, to prevent the marring of floor. Strongly riveted and braced. Heavy cast iron grate.

No. 18 gauge steel, complete....	Price, each	\$2 00
No. 16 gauge steel, complete....	"	2 50
Extra grates.....	"	40
Hoods or covers.....	"	50
Hoods with pipe outlet.....	"	1 00

Discount.....

SHOP SAWS.

Q. & C.

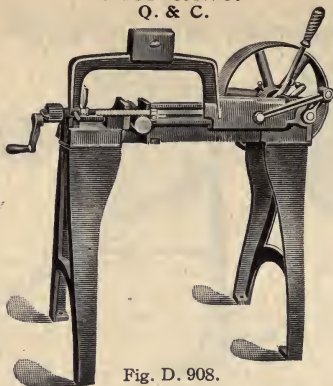


Fig. D. 908.

No. 1.

The No. 1 shop saw has a capacity for cutting bars up to 4 inches square and being provided with gravity feed, will cut any material. The *gravity feed* is adjusted by altering the position of the weight on the arm, and can be regulated to such a degree of fineness that high carbon steel can be cut off square and true since the blade is not forced beyond a suitable feed.

The saw frame or arm can be raised or lowered by hand, and will operate in almost any position up to nearly 45 degrees to base of machine, making it an extremely desirable proposition for cutting odd shapes such as risers from small steel castings.

An automatic stop is provided to instantly stop the saw when the work is cut through.

The machine is started by a clutch on the driving shaft, thus rendering a countershaft unnecessary.

The saw guide is of hardened steel and holds the blade close to the work. All rods and shafts are of steel and the machine is well and substantially built.

No. 3.

The machine is fitted with a *swivel vise* so that cuts on material up to 5 inches thick can be made at any angle up to and including 45 degrees.

An adjustable automatic stop is provided to stop the machine at any position of the blade. The machine is also provided with a gauge for cutting duplicate pieces.

The blades used are 14 inch.

Number.	No. 1.	No. 3.
Capacity.....	4x4 inches	5x6 inches
Stroke of saw blade.....	6 inches	6 inches
Length of saw blade.....	12 inches	14 inches
Size of pulley.....	14x2½ inches	14x2½ inches
Speed per minute.....	60 revolutions	60 revolutions
Feed.....	Gravity	Gravity
Floor space.....	18x30 inches	18x30 inches
Height over all.....	36 inches	36 inches
Net weight.....	135 pounds	175 pounds
Weight, boxed for export.....	180 pounds	225 pounds
Size, boxed for export.....	18x19x32 inches	18x19x32 inches
Price, each.....	\$16 75	\$22 50

SHOP SAWS.

Q. & C.



Fig. D. 909.

No. 4; Positive Feed.

This machine is suitable for cutting steel bars and shafting, light architectural iron, pipe up to 7 inches diameter, and forgings or castings within its capacity.

It is arranged to be run directly from a line shaft, and requires no attention when once started, being fitted with an automatic stop, which can be set to stop the saw at any distance up to 3 inches above the table. The feed is automatic and adjustable from 1-45 to 1-5 of an inch per minute, and by clamping the split feed nut, the saw frame can be raised or lowered by hand independently of the feed screw.

The machine is fitted with a *swivel vise*, so that cuts on material up to 7 inches thick can be made at any angle up to and including 45 degrees.

The vise or table can be lowered 6 inches to admit work of large size, and can be bolted at any desired height. The adjustable table, however, is only available for making straight cuts.

Both carriage slide and frame slide are fitted with adjustable gibs, by which all wear can be taken up.

The blades used with this machine are heavy, and will not break under severe strain.

Several of these machines can be operated by one attendant, or they may be used for cutting off work by placing them where they may be used by men in charge of machines.

Furnished complete with one-half dozen Saw Blades.

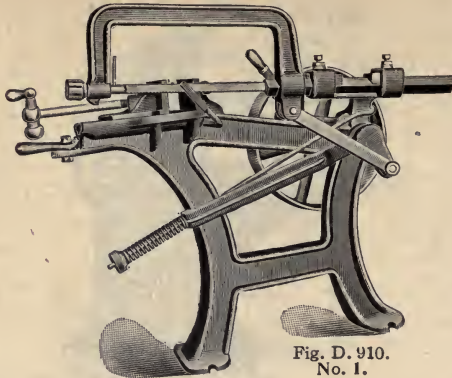
Capacity, solids.....	7x8 inches	Stroke of saw blade.....	6 inches
Floor space.....	12x32 inches	Length of saw blade.....	17 inches
Height over all.....	38 inches	Thickness of saw blade.....	$\frac{1}{8}$ inch
Size of pulley.....	14x3 inches	Net weight.....	245 pounds
Height of work table.....	21 inches	Gross weight.....	285 pounds
Speed per minute.....	60 revolutions	Size, boxed for export..	20x26x37 inches
Feed per minute.....	1-45 to 1-5 inch		

Price, each.....\$45 00

No. 4 SHOP SAW.

Arranged for Motor Drive.

Description and price upon application.

POWER HACK SAW.**Marvel.****Fig. D. 910.
No. 1.**

Saws fast and straight. Saves saw blades.

The No. 1 saw is equipped with an eccentric on inner portion of crank, fitted to an arm that presses against the coiled steel spring, through which extends a steel rod, hooked firmly to rear portion of saw frame bearing, the tension pressing the saw down on material on the *draw cut*. On return or push motion the tension releases. The tension on spring is regulated by hand nut at end of spring. Also has a device that raises or lowers saw and holds it at any desired angle, allowing free use of both hands in measuring material.

Saws close to vise; a quick action vise that saves time.

An extension to table so material rests on both sides of saw.

The wear can be taken up to any extent in the two saw bearings, which have also receptacles for oiled waste.

The drive shaft has bronze bearing.

Starter and automatic stop are at front of machine.

The No. 2 saw has all the features of the No. 1, and in addition has a *quick action heavy vise which swivels both ways* so that material can be inserted to cut on an angle either way.

The wear can be taken up to any extent in the two saw bearings which have also receptacles for oiled waste.

The drive shaft has bronze bearing.

Feed lever at top carries tension thumb screw, and *should be left engaged* when sawing medium or light material. The same lever raises or lowers saw and holds it in any position, a great convenience in measuring. Has adjustable stroke. Longest, 6½ inches; shortest, 4 inches.

This saw is strong, heavy and exceptionally rigid in construction.—The entire vise can be instantly removed (leaving a T-slotted table for holding irregular shapes) and makes an excellent tool for clamping work on drill press, etc.

Number.	No. 1.	No. 2.
Capacity, Inches.....	4x4	{6x6 on long stroke 8x8 on short stroke
Length of Blade, Inches.....	12	12 to 17
Revolutions Per Minute.....	60 to 90	50 to 70
Weight.....	110 lbs.	260 lbs.
Price, Each.....	\$16 75	\$35 00

Discount.....

HIGH SPEED POWER HACK SAW.

With Automatic Stock Feed.
Marvel.

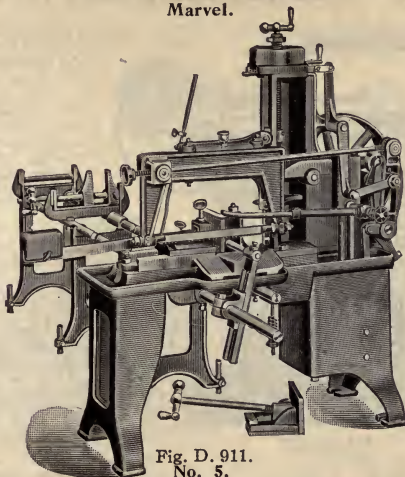


Fig. D. 911.
No. 5.

Approximate cutting speed when using an ordinary hack saw blade; 1-in. Rd. steel, $\frac{1}{4}$ min.; 2-in. Rd. $2\frac{1}{2}$ min.; 3-in. Rd. 5 min.; 4-in. Rd. $7\frac{1}{2}$ min.; 5-in. Rd. 13 min.; 6 in. Rd. 24 min.

The stock feeding attachment raises the saw frame, opens the chuck, feeds the bar forward, closes chuck and starts a new cut in from 10 to 15 seconds.

The saw frame always moves in a horizontal position, is actuated by a crank lever which imparts a smooth, even cutting stroke to the saw blade, and gives a quick return.

The entire blade can be used up by shifting the saw frame by means of a right and left screw on the connecting rod while running.

The chuck has liberal dimensions with jaws which extend out flush with saw blade and is capable of taking eight inches. It can also be shifted forward or back and will swivel to either right or left for cutting on an angle.

In a slot in saddle in back of machine and easy of access are two dogs, upper one of which may be instantly set to stop the cut at any desired depth.

The stroke can be changed from four to six and one-half inches by means of shifting bolt in the crank.

This machine is provided with the old reliable plunger pump with ball valves and overflow tank which gives a steady stream of compound on the saw blade. It is immersed in the bottom of tank. Pump and all connections may be removed in five minutes by removal of the two cap screws in outer wall of large tank.

The saw cuts on the draw stroke and lifts free of the cut on the return. Capacity, 6 in. by 6 in.

Takes three-inch belt. Speed 130 R. P. M. Size of pulley $16 \times 3\frac{1}{2}$ inches. Net weight 565 lbs. Weight, crated, 650 lbs.

Two bars $1\frac{1}{2}$ inch round steel shafting are required for vise carriage. These bars are not included in any quotations or weights given on account of inconvenience of shipping and freight and as they are easily procured.

This machine is also furnished without stock feed attachments.

Price.....\$175 00

Discount.....

"WILLEY" ELECTRICALLY DRIVEN HACK SAW.

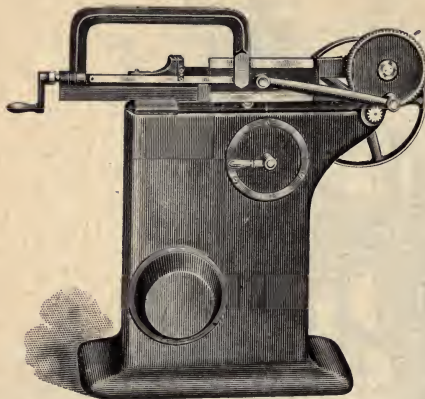


Fig. D. 912.

The motor is completely enclosed within the housing and can not be injured by dirt or anything getting into it. The starting switch is also enclosed and is operated by the handle at the upper right-hand corner of housing. The saw feeds by gravity and has an automatic stop which releases the switch when work is cut off.

It is gear driven, with adjustable weight on top of saw frame for varying pressure of jaw.

It is designed for 12-inch saw blades and will cut off stock $4\frac{1}{2}$ inches in diameter. The motor has self-feeding carbon brushes, self-oiling bearings with renewable bushings, iron-clad armature with tool steel shaft, and is made with the greatest care. Can be mounted on low roller truck for easy

transportation from place to place when it is not convenient to handle material to be cut.

Furnished with graduated swiveling vise for \$10.00 extra. Will swivel to 45-degree angle.

Stroke of saw blade.....	6 in.
Number of strokes per minute.....	50 to 60
Geared.....	5 to 1
Height of machine.....	31 $\frac{1}{2}$ in.
Weight of machine.....	310 lbs.
Weight of machine crated for domestic shipment.....	460 lbs.
Weight of machine boxed for foreign shipment.....	520 lbs.
Outside dimensions of box for foreign shipment.....	33x33x19 in
Size jaws, 2 $\frac{1}{2}$ in. high, 3 $\frac{1}{2}$ in. wide, 4 $\frac{1}{2}$ in. opening.	
Floor space.....	15x33 in.
Maximum horse power of motor.....	$\frac{1}{2}$
Wound for either 110 or 220 volts, direct or alternating current.	
Price.....each	\$115 00
2 or 3-phase, 60-cycle, alternating current.....	125 00

Discount.....

PORTABLE HACK SAW MACHINE.

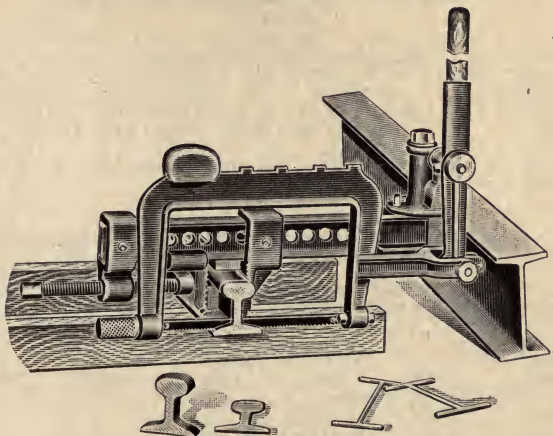


Fig. D. 913.

This portable hack saw is a decided improvement over the old style portable circular saw, which is at best heavy and clumsy and takes two men to set up and operate. The saw shown above weighs but 110 pounds set up ready to run, and one man can easily do the work of two men using the old style machine or with ordinary hand hack saws. One man can easily cut through a 9-inch rail or I-beam at any angle up to 45 degrees in from twenty-five to thirty minutes without resting. Saws in this machine make clean, straight cuts and the danger of their breaking is reduced to a minimum.

Takes 14-inch blades.

Weight, 90 pounds.

Price, with 1 dozen blades.....	\$55 00
Extra blades, 14-inch, per gross.....	18 00

HACK SAW BLADES.



Fig. D. 914.

Starrett.

No. 103.

With common teeth, 18 to the inch.

Length, inches.....	6	7	8	9	10	11	12
Per dozen.....	\$0 59	\$0 63	\$0 67	\$0 75	\$0 83	\$0 92	\$1 00
Per gross.....	7 00	7 50	8 00	9 00	10 00	11 00	12 00

Discount.....

The 6, 7, 8 and 9-inch saws are $\frac{1}{8}$ inch wide, .022 inch thick the 10, 11 and 12-inch are $\frac{1}{4}$ inch wide, .022 inch thick.

No. 102.

With Fine Teeth.

For sawing tubing, brass, copper and sheet metal. 24 teeth to the inch. Width and thickness same as No. 103. Prices same as for No. 103.

No. 112

With Common Teeth, 18 to the inch.

For power machines or hand frame. Are $\frac{1}{8}$ inch wide, .030 inch thick.

Length, inches.....	8	9	10	12
Per dozen.....	\$0 75	\$0 80	\$ 0 85	\$ 1 05
Per gross.....	9 00	9 60	10 20	12 60

Discount.....

No. 114.

For Large Power Saws.

The No. 114 blades are $\frac{1}{2}$ inch wide, .032 inch thick, and have 14 teeth to the inch. These blades are hardened throughout and are adapted specially for heavy work in large power machines like the Q and C, Marvel and others.

Length, inches....	12	13½	14	16	17
Per dozen.....	\$ 1 25	\$ 1 50	\$ 1 50	\$ 1 75	\$ 1 85
Per gross.....	15 00	18 00	18 00	21 00	22 20

Discount.....

Star.

Length, inches.....	6	7	8	9	10	11	12
Per dozen.....	\$0 30	\$0 32	\$0 34	\$0 38	\$0 42	\$0 46	\$0 50

Discount.....

Stubbs.

Length, inches.....	6	7	8	9	10	11	12	14	16
Per dozen.....	\$2 00	\$2 50	\$3 00	\$3 50	\$4 00	\$4 50	\$5 00	\$6 00	\$8 00

Discount.....

Disstons.

Length, inches.....	8	9	10	11	12	13	14	16	18
Per dozen.....	\$2 80	\$3 00	\$3 25	\$3 50	\$3 75	\$4 25	\$4 50	\$5 50	\$6 00

Discount.....

Hack saw blades continued on next page.

HACK SAW BLADES.

Universal.



Fig. D. 915.

Made of "Jessop" steel. A blade of superior quality.
Hand Blades.

23—.025 Gauge.

Length, Inches.	Width, Inches.	Price Per Gross.	Price Per Dozen.
6	$\frac{1}{4}$	\$ 7 00	\$0 59
7	$\frac{1}{4}$	7 50	63
8	$\frac{1}{4}$	8 00	67
9	$\frac{1}{4}$	9 00	75
10	$\frac{1}{4}$	10 00	84
11	$\frac{1}{4}$	11 00	92
12	$\frac{1}{4}$	12 00	1 00

Discount.....

The 23-gauge saws listed above are made in four cuts of teeth, viz.:

Regular, 16 teeth per inch, 6 inches to 11 inches, for cutting soft steel solids.

Regular, 14 teeth per inch, 12 inches only.

Fine, 24 teeth per inch, all lengths, for cutting brass, black pipe, drill rod, etc.

Tubing, 32 teeth per inch, all lengths, for cutting thin tubing, thin sheet steel or brass, or very small material.

Power Machine Blades.

Length, Inches.	Width, Inches.	Gauge.	Teeth.	Price Per Gross.	Price Per Dozen.
12	$\frac{3}{4}$	21—.032	14	\$15 00	\$1 25
14	$\frac{3}{4}$	21—.032	14	18 00	1 50
12	$\frac{3}{4}$	18—.049	10	18 00	1 50
14	$\frac{3}{4}$	18—.049	10	21 60	1 80
17	$\frac{3}{4}$	18—.049	10	27 60	2 30
17	1	18—.049	10	36 00	3 00
17	1	16—.065	8	39 00	3 25
20	1	16—.065	8	45 20	3 75
24	1	16—.065	8	54 00	4 50

Discount.....

14-inch blades are $13\frac{1}{2}$ inches to centers. 17-inch are $16\frac{1}{2}$ inches to centers.

HACK SAW FRAMES.

Adjustable Frame.



Fig. D. 916.

This frame is made of extra heavy stock, highly finished, and is very rigid. The hard wood handle is fully in keeping with the frame and fits the hand perfectly. The adjustments are easy, positive and accurate. All small parts are case hardened. Takes blades from 6 to 12 inches. Distance from bottom of frame to tooth edge of saw, $3\frac{1}{4}$ inches. Diameter of handle, $1\frac{1}{8}$ inches. Length of handle, $4\frac{1}{2}$ inches. Body of frame, $\frac{1}{2}$ inch by $\frac{1}{8}$ inch.

Price, each, \$1.00. Per dozen, \$12.00.

Discount.....

HAND SAWS.

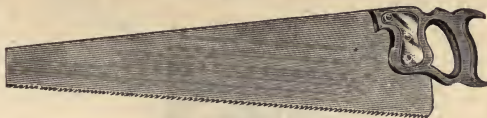


Fig. D. 921.

Calumet Brand.

Railroad Hand Saws, 26-inch, per dozen.....\$12⁰⁰

C. A. & Co. Brand.

Price, per dozen.....\$ 9⁰⁰

Gem Brand.

Price, per dozen.....\$ 8⁰⁰

Discount.....

CROSS CUT SAWS.



Fig. D. 922.

American Tooth.



Fig. D. 923.

Common or Tennon Tooth.

Price each, without handles.

Length, Feet.....	4	4½	5	5½	6	6½	7	7½	8
American, 14x16 gauge.	\$2 24	2 52	2 80	3 08	3 36	3 64	3 92	4 20	4 48
American, 14x18 gauge.	2 40	2 70	3 00	3 30	3 60	3 90	4 20	4 50	4 80
Common or Tennon, 14x16 gauge.....	1 92	2 16	2 40	2 64	2 88	3 12	3 36	3 60	3 84
Common or Tennon, 14x18 gauge.....	2 08	2 34	2 60	2 86	3 12	3 38	3 64	3 90	4 16

Discount.....

Patent handles for above, per pair.....\$0 35

SAWS.

Circular.

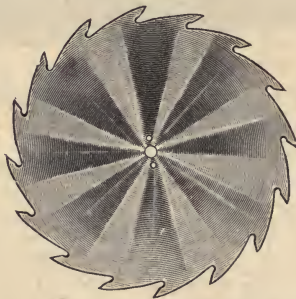


Fig. D. 924.

Patent Ground and Tempered.

Diameter. Inches.	Thickness Gauge.	Size of Hole, Inches.	List Price, Each.	Extra for Each Additional Gauge (Heavier.)	Diameter, Inches.	Thickness Gauge.	Size of Hole, Inches.	List Price, Each.	Extra for Each Additional Gauge (Heavier)
4	19	$1\frac{1}{4}$	\$ 1 20	\$ 01	30	10	$1\frac{1}{4}$	\$ 21 00	\$ 41
5	19	$1\frac{1}{4}$	1 50	01	32	10	$1\frac{1}{4}$	24 00	47
6	18	$1\frac{1}{4}$	1 80	02	34	9	$1\frac{1}{4}$	27 00	54
7	18	$1\frac{1}{4}$	2 10	03	36	9	$1\frac{1}{4}$	31 00	65
8	18	$1\frac{1}{4}$	2 40	03	38	9	$1\frac{1}{4}$	35 00	72
9	17	$1\frac{1}{4}$	2 80	04	40	9	$1\frac{1}{4}$	41 00	83
10	16	1	3 30	04	42	8	2	47 00	94
11	16	1	3 90	06	44	8	2	55 00	1 08
12	15	1	4 40	07	46	8	2	65 00	1 26
14	14	$1\frac{1}{4}$	5 30	09	48	8	2	75 00	1 44
16	14	$1\frac{1}{4}$	6 50	11	50	7	2	85 00	1 62
18	13	$1\frac{1}{4}$	8 00	14	52	7	2	95 00	1 80
20	13	$1\frac{1}{4}$	9 50	18	54	7	2	105 00	2 16
22	12	$1\frac{1}{4}$	11 50	22	56	7	2	120 00	2 52
24	11	$1\frac{1}{4}$	13 50	25	58	7	2	135 00	2 88
26	11	$1\frac{1}{4}$	16 00	29	60	6	2	150 00	3 24
28	10	$1\frac{1}{4}$	18 50	36					

No extra charge for saws one gauge thicker than list.

Discount.....

BAND SAWS.**Narrow.****Fig. D. 925.****Made from finest imported Swedish steel.**

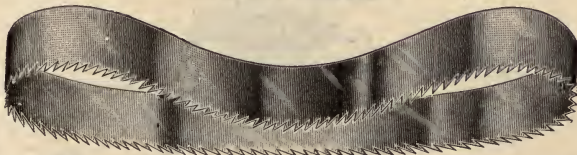
Width, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Gauge.....	22	21	21	21	20	20	20	20	20	19	19	19	19	18	18
List Price, per foot..	\$0 09	11	12	14	16	17	19	21	23	26	29	32	38	50	50
Brazing, extra.....	15	15	15	20	20	20	25	25	25	35	35	45	50		

Above list prices are for saws not joined, set or filed.

Filing and setting, add 4 cents per foot extra.

Band saws for metal, add 50 per cent to list.

When ordering, give length, width and points to the inch. State if wanted set and filed.

*Discount.....***BAND SAWS.****Wide or Resaws.****Fig. D. 926.**

Width, Inches.	Usual Gauge.	Price, Per Foot.
2	19 to 21	\$0 65
$2\frac{1}{4}$	19 to 21	85
3	18 to 20	1 05
$3\frac{1}{4}$	18 to 20	1 25
4	18 to 20	1 45
$4\frac{1}{4}$	18 to 20	1 65
5	18 to 20	1 85
$5\frac{1}{4}$	18 to 20	2 05
6	18 to 20	2 25

Discount.....

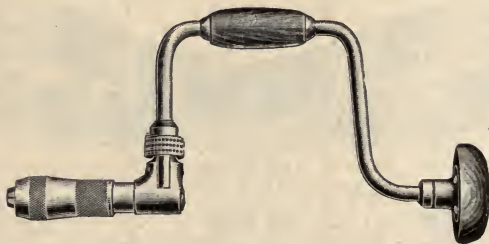
Above prices include joining and fitting, ready for use.

BIT BRACES.**Ball Bearing.****Fig. D. 927.**

The head has a bearing of steel balls, running on hardened steel plates, so no wear can take place, and the friction is reduced to the minimum. The brace is heavily nickel plated and warranted in every particular.

No.	Sweep, Inches.	Price, Per Dozen.	No.	Sweep, Inches.	Price, Per Dozen.
10	14	\$33 00	13	8	\$24 00
11	12	30 00	14	6	21 00
12	10	27 00			

Discount.....

RATCHET BRACES.**Fig. D. 928.**

The head has a bearing of steel balls, running on hardened steel plates, so no wear can take place, and the friction is reduced to the minimum. The brace is heavily nickel plated and warranted in every particular.

No.	Sweep, Inches.	Price, Per Dozen.	No.	Sweep, Inches.	Price, Per Dozen.
30	14	\$42 00	33	8	\$33 00
31	12	39 00	34	6	30 00
32	10	36 00			

Discount.....

BREAST DRILLS.



Fig. D. 929.
Nos. 10 and 11.

No. 10.—With ball bearings, extension crank, alligator jaws, which hold both round and square shanks, and a patent level attachment. The gears are cut and are changeable from even, to speeded 3 to 1.

Price.....per doz., \$36 00

No. 11 Drill is same finish as No. 10, but the chuck is arranged with three jaws for round shanks and will center quite accurately. It holds from 0 to 17-64.

Price.....per doz., \$36 00

Discount.....

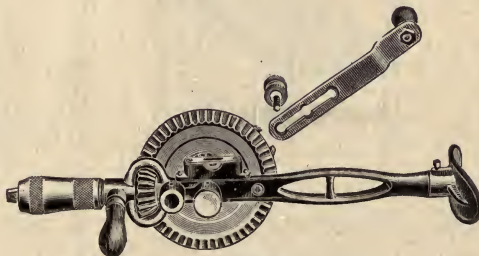


Fig. D 930.

Nos. 12, 15 and 18.

No. 12.—Has extra pair of jaws for fine drills with ball bearings, extension crank alligator jaws, which hold both round and square shanks, and a patent level attachment. The gears are cut and are changeable from even, to speeded 3 to 1.

Price.....per doz., \$30 00

No. 15. This Drill is same in pattern and finish as No. 12, with exception that it has a D handle instead of Breast Plate. We are furnishing considerable quantities of them for use in car shops.

Price.....per doz., \$30 00

No. 18. This Drill is same in pattern and finish (excepting in the chuck), as No 12. The chuck is arranged with three jaws for round shanked points (only) from 1-16 to $\frac{1}{4}$ inch inclusive.

It will center accurately.

Price.....per doz , \$42 00

Discount.....

WOOD HAND SCREWS.

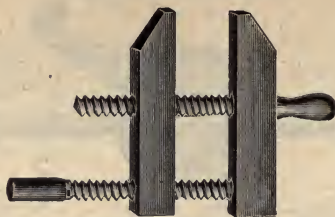


Fig. D. 931.

No.	Diameter Screw, Inches.	Length Screw, Inches.	Length Jaw, Inches.	Size of Jaw, Inches.	Opens, Inches.	List Price, Per Doz.	No.
800	1½	28	24	3 x 3	17	\$40 00	800
801	1½	26	22	2½ x 2½	15½	35 00	801
802	1½	24	20	2½ x 2½	13½	32 00	802
803	1½	22	20	2½ x 2½	12	30 00	803
804	1½	22	18	2½ x 2½	12½	28 50	804
805	1½	20	18	2½ x 2½	10½	27 00	805
806	1	20	16	2½ x 2½	11	25 00	806
807	1	18	16	2½ x 2½	9½	23 50	807
808	¾	18	14	2½ x 2½	10	22 00	808
809	¾	16	14	2 x 2	8½	20 00	809
810	¾	16	12	1½ x 1½	8½	18 50	810
811	¾	14	12	1½ x 1½	7½	17 00	811
812	¾	12	10	1½ x 1½	5½	14 50	812
813	¾	10	8	1½ x 1½	4½	12 00	813
814	¾	8	7	1½ x 1½	3	9 50	814
815	¾	6	5	1 x 1	2	8 00	815
816	¾	5	4	¾ x ¾	1½	7 00	816

Parts, either Screws or Jaws, list one-third price of complete Hand Screw.

Discount.....

BENCH SCREWS.

Wrought Iron.



Fig. D. 932.

Hardwood Handle, Movable Collar, Double Threaded Screw.

Diameter of Screw....	1 inch.	1½ inch.	1½ inch.	1½ inch.
Length over all.....	16 "	16 "	17 "	21 "
Length of Thread.....	11 "	11 "	12 "	14 "
Price.....per doz.	\$10 40	\$12 00	\$14 00	\$21 00

Discount.....

BORING MACHINES.

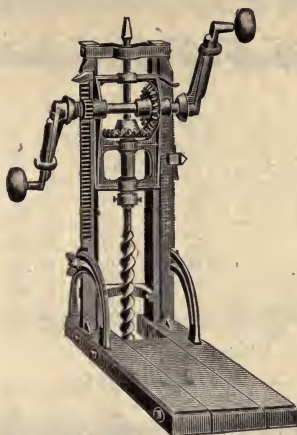


Fig. D. 933.

Angular Machine.....	each, \$ 6.50
Angular Machine with Augers.....	" 11 00
Discount.....	

CAST STEEL BORING MACHINE AUGERS.



Fig. D. 934.

Inches.....	$\frac{1}{4}$ to $\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Per dozen.....	\$10 00	11 00	13 00	15 00	17 00	19 00	21 00	24 00	28 00	32 00

For sizes larger than 2 inches, use nut auger list, page 475.

In Sets.

Set of 18 quarters.....	\$ 6 00
Set of 23 quarters.....	7 50
Set of 41 quarters.....	13 50

Discount.....

SHIP AUGERS.

Prices With or Without Screws.
In ordering, state which are wanted.



Fig. D. 935.

		Per Doz.			Per Doz.
$\frac{1}{2}$ inch and under	.....	\$ 7 50	33 and 34-16 inch	.....	\$ 57 00
9 and 10-16 inch	.....	9 00	35 " 36-16 "	.....	72 00
11 " 12-16 "	.....	10 50	37 " 38-16 "	.....	86 00
13 " 14-16 "	.....	12 00	39 " 40-16 "	.....	101 00
15 " 16-16 "	.....	13 50	41 " 42-16 "	.....	115 00
17 " 18-16 "	.....	15 00	43 " 44-16 "	.....	130 00
19 " 20-16 "	.....	16 50	45 " 46-16 "	.....	144 00
21 " 22-16 "	.....	18 00	47 " 48-16 "	.....	158 00
23 " 24-16 "	.....	21 00	49 " 50-16 "	.....	173 00
25 " 26-16 "	.....	24 00	51 " 52-16 "	.....	187 00
27 " 28-16 "	.....	27 50	53 " 54-16 "	.....	201 00
29 " 30-16 "	.....	31 50	55 " 56-16 "	.....	216 00
31 " 32-16 "	.....	38 00	57 " 58-16 "	.....	231 00

Discount.....

AUGER BITS.



Sizes in 16ths of an inch.

Fig. D. 936.

Price, per dozen.

$\frac{3}{16}$	$\frac{4}{16}$	$\frac{5}{16}$	$\frac{6}{16}$	$\frac{7}{16}$	$\frac{8}{16}$	$\frac{9}{16}$	$\frac{10}{16}$	$\frac{11}{16}$	$\frac{12}{16}$	$\frac{13}{16}$
\$4 50	4 00	4 00	4 00	4 50	5 00	5 50	6 00	7 00	7 00	8 00
$\frac{14}{16}$	$\frac{15}{16}$	$\frac{16}{16}$	$\frac{17}{16}$	$\frac{18}{16}$	$\frac{19}{16}$	$\frac{20}{16}$	$\frac{21}{16}$	$\frac{22}{16}$	$\frac{23}{16}$	$\frac{24}{16}$
\$8 00	9 00	9 00	10 50	10 50	12 00	12 00	13 50	13 50	15 00	15 00
$\frac{26}{16}$	$\frac{28}{16}$	$\frac{30}{16}$	$\frac{32}{16}$	Set 18 Quarters		Set 24 Quarters		Set 32 $\frac{1}{2}$ Quarters		
\$17 00	19 00	21 00	23 00	\$4 00 Set		\$5 25 Set		\$7 00 Set		

Discount.....

CLARK'S EXPANSIVE BITS.



Fig. D. 937.

No. 1, Small Size	Cuts from $\frac{1}{2}$ to $1\frac{1}{2}$ inch	per doz.,	\$18 00
" 2, Large	" " $\frac{1}{2}$ to 3 "	"	26 00

Extra Cutters for Clark's Bits.

Nos.....	For Small Bits.		For Large Bits.	
	1	2	3	4
Inch.....	$\frac{1}{2}$ to $\frac{7}{8}$	$\frac{1}{2}$ to $1\frac{1}{2}$	$\frac{1}{2}$ to $1\frac{1}{2}$	$1\frac{1}{2}$ to 3
Per dozen.....	\$3 00	3 75	5 25	6 00

Discount.....

CAR BITS.



Fig. D. 938.

Cast Steel. Warranted.

Size in 16ths.....	4	5	6	7	8	9	10	11
Price per dozen.....	\$9 00	9 00	9 00	10 00	11 25	12 50	13 75	15 00
Size in 16ths.....	12	13	14	15	16	17	18	20
Price per dozen.....	16 25	17 50	19 00	20 50	22 00	24 00	26 00	30 00

Discount.....

NUT AUGERS.



Fig. D. 939.

Size in inches.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$
Price per dozen.....	\$7 00	8 25	9 50	10 75	12 00	13 25	15 00
Size in inches.....	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$
Price per dozen.....	\$17 00	19 00	22 00	26 00	30 00	35 00	40 00
Size in inches.....	$2\frac{1}{2}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	4
Price per dozen.....	\$50 00	70 00	90 00	120 00	150 00	180 00	210 00

Discount.....

SHIP AUGER CAR BITS.



Fig. D. 940.

With or Without Screw.

12-inch twist.

Size in inches.....	4-16	5	6	7	8	9	10	11	12
Price per dozen.....	\$8 50	8 50	9 00	9 50	10 00	10 50	11 00	11 50	12 00
Size in inches.....	13	14	15	16	17	18	19	20	21
Price per dozen.....	12 50	13 00	14 00	14 50	15 50	16 00	17 00	17 50	18 50
Size in inches.....	22	23	24	25	26	27	28	29	30
Price per dozen.....	19 00	21 50	22 00	25 00	25 50	28 00	28 50	29 50	30 00

Discount.....

MACHINE BITS.



Fig. D. 941.

Price Per Doz.

Diam. inches in 16ths	6-In. Twist	8-In. Twist	10-In. Twist	12-In. Twist	14-In. Twist	16-In. Twist	18-In. Twist	20-In. Twist	22-In. Twist	24-In. Twist
4	\$ 7 80	\$ 9 36	\$10 92	\$12 48						
5	8 40	10 08	11 76	13 44						
6	9 00	10 80	12 60	14 40	\$ 16 20	\$ 18 00				
7	9 90	11 88	13 86	15 84	17 82	19 80				
8	10 80	12 96	15 12	17 28	19 44	21 60	\$ 23 76	\$ 25 92	\$ 28 08	
9	12 00	14 40	16 80	19 20	21 60	24 00	26 40	28 80	51 20	
10	13 20	15 84	18 48	21 12	23 76	26 40	29 04	31 68	34 32	\$ 36 96
11	14 40	17 28	20 16	23 04	25 92	28 80	31 68	34 56	37 44	40 32
12	15 60	18 72	21 84	24 96	28 08	31 20	34 32	37 44	40 56	43 68
13	16 80	20 16	23 52	26 88	30 24	33 60	36 96	40 32	43 68	47 04
14	18 00	21 60	25 20	28 80	32 40	36 00	39 60	43 20	46 80	50 40
15	19 20	23 04	26 88	30 72	34 56	38 40	42 24	46 08	49 92	53 76
16	20 40	24 48	28 56	32 64	36 72	40 80	44 88	48 96	53 04	57 12
17	21 60	25 92	30 24	34 56	38 88	43 20	47 52	51 84	56 16	60 48
18	22 80	27 36	31 92	36 48	41 04	45 60	50 16	54 72	59 28	63 84
19	24 00	28 80	33 60	38 40	43 20	48 00	52 80	57 60	62 40	67 20
20	25 20	30 24	35 28	40 32	45 36	50 40	55 44	60 48	65 52	70 56
21	26 40	31 68	36 96	42 24	47 52	52 80	58 08	63 36	68 64	73 92
22	27 60	33 12	38 64	44 16	49 68	55 20	60 72	66 24	71 76	77 28
23	28 80	34 56	40 32	46 08	51 84	57 60	63 36	69 12	74 88	80 64
24	30 00	36 00	42 00	48 00	54 00	60 00	66 00	72 00	78 00	84 00
25	31 50	37 80	44 10	50 40	56 70	63 00	69 30	75 60	81 90	88 20
26	33 00	39 60	46 20	52 80	59 40	66 00	72 60	79 20	85 80	92 40
27	34 50	41 40	48 30	55 20	62 10	69 00	75 90	82 80	89 70	96 60
28	36 00	43 20	50 40	57 60	64 80	72 00	79 20	86 40	93 60	100 80
29	37 50	45 00	52 50	60 00	67 50	75 00	82 50	90 00	97 50	105 00
30	39 00	46 80	54 60	62 40	70 20	78 00	85 80	93 60	101 40	109 20
31	40 50	48 60	56 70	64 80	72 90	81 00	89 10	97 20	105 30	113 40
32	42 00	50 40	58 80	67 20	75 60	84 00	92 40	100 80	109 20	117 60
33	43 80	52 56	61 32	70 08	78 84	87 60	96 36	105 12	113 88	122 64
34	45 60	54 72	63 84	72 96	82 08	91 20	100 32	109 44	118 56	127 68
35	47 40	56 88	66 36	75 84	85 32	94 80	104 28	113 76	123 24	132 72
36	49 20	59 04	68 88	78 72	88 56	98 40	108 24	118 08	127 92	137 76
37	51 00	61 20	71 40	81 60	91 80	102 00	112 20	122 40	132 60	142 80
38	52 80	63 36	73 92	84 48	95 04	105 60	116 16	126 72	137 28	147 84
39	54 60	65 52	76 44	87 36	98 28	109 20	120 12	131 04	141 96	152 88
40	56 40	67 68	78 96	90 24	101 52	112 80	124 08	135 36	146 64	157 92

Discount.....

No extra charge for turning shanks on Machine Bits or Hub Augers to any size required, provided they are straight and do not exceed 3 inches in length or $\frac{1}{8}$ in diameter. Shanks exceeding these dimensions, either longer or larger, will be charged extra.

In making special shanks to order, we will not be held responsible for perfect fit unless we are furnished a sample shank of exact size desired.

All Bits made by odd 32nds will be charged the price of the 16th larger.

STEEL DRILL SOCKETS.**Unfinished Shanks.**Fig. D. 942.
No. 116.

No.	Holds Drills, Inclusive.	Length, Inches.	Diameter of Shank.	Price, Each.
1	$\frac{1}{4}$ to $\frac{13}{32}$	7	$1\frac{1}{4}$	\$1 20
2	$\frac{11}{32}$ to $\frac{1}{2}$	8	$1\frac{1}{4}$	1 80
3	$\frac{11}{32}$ to $1\frac{1}{4}$	10	$1\frac{1}{4}$	2 50
4	$1\frac{1}{8}$ to 2	13	$1\frac{1}{4}$	4 00
5	$2\frac{1}{8}$ to 3	15	$2\frac{1}{4}$	7 50
6	$3\frac{1}{8}$ to 4	18	3	14 00

Discount.....

Finished Shanks.Fig. D. 943.
No. 117.

No.	With Shank Fitted to	Price, Each.	No.	With Shank Fitted to	Price, Each.
1	No. 2 Socket	\$2 00	3	No. 4 Socket	\$ 3 20
1	" 3 "	2 50	3	" 5 "	4 80
1	" 4 "	3 20	4	" 3 "	4 80
1	" 5 "	4 80	4	" 4 "	4 80
2	" 3 "	2 50	4	" 5 "	4 80
2	" 4 "	3 20	4	" 6 "	12 00
2	" 5 "	4 80	5	" 4 "	12 00
3	" 2 "	3 20	5	" 5 "	12 00
3	" 3 "	3 20	5	" 6 "	12 00

Discount.....

Steel Sleeves.Fig. D. 944.
No. 118.

No.	Fitted to Socket.	Price, Each.	No.	Fitted to Socket.	Price, Each.
1	No. 2	\$1 80	2	No. 5	\$4 40
1	" 3	2 40	3	" 4	3 00
1	" 4	3 00	3	" 5	4 40
1	" 5	4 40	4	" 5	4 40
2	" 3	2 40	4	" 6	10 00
2	" 4	3 00	5	" 6	10 00

Discount.....

STEEL DRILL SOCKETS.

The "Use-em-up" Drill Socket.



Fig. D. 945.
Sleeve Type.

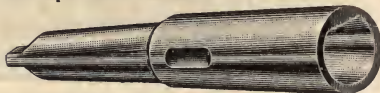


Fig. D. 946.
Socket Type.

Will put into immediate use drills and reamers with tangs twisted off, by grinding flat surface on the remaining shank. Special tools can be made to fit these sockets without the expense of milling a tang.

No.	Fitted to Socket	Sleeve Type.	Socket Type.	No.	Fitted to Socket	Sleeve Type.	Socket Type.
		Price, Each.	Price, Each.			Price, Each.	Price, Each.
1	No. 2	\$1 80	\$2 00	2	No. 5	\$4 40	\$4 80
1	" 3	2 40	2 50	3	" 4	3 00	3 20
1	" 4	3 00	3 20	3	" 5	4 40	4 80
1	" 5	4 40	4 80	4	" 5	4 40	4 80
2	" 3	2 40	2 50	4	" 6	10 00	12 00
2	" 4	3 00	3 20	5	" 6	10 00	12 00

Discount.....

ARMSTRONG AUTOMATIC DRILL DRIFT.

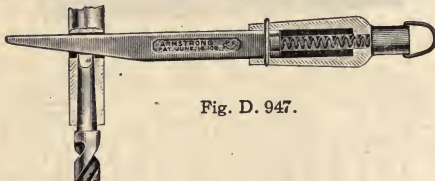


Fig. D. 947.

The utility of this tool will be readily appreciated by all who are familiar with the operating of drill presses and similar machines.

Practically it is the ordinary drift and hammer, combined in one, but with the great advantage that it requires but one hand to operate it, thus naturally leaving the other hand free to hold the drill or chuck and prevent it from falling, as it always does when the operator is compelled to use both hands to hold and drive the old-style drift.

The heavy handle or driver is slidably mounted upon the blade which is kept extended, when not in operation, by a low tension coil spring. The blade is drop forged of steel and hardened.

In operating the point of the blade is inserted in the slot of drill socket and the handle driven forcibly up the blade, until it strikes the butt end of the drift blade—it will strike a blow sufficiently heavy to remove the most stubborn drill.

Each tool is packed in a cardboard box.

No.	Capacity.	Recom- mended for.	Price, Each.	Extra Blades, Each.
1-A	No. 1, 2 or 3 Morse Taper	No. 1 or 2	\$1 25	\$0 40
2-A	No. 2, 3 or 4 Morse Taper	No. 2 or 3	1 50	50
3-A	No. 3, 4 or 5 Morse Taper	No. 3 or 4	2 00	65

Discount.....

TAPER SQUARE SHANK DRILLS.

Fitting Ratchets.—No. 1 Shank.



Fig. D. 948.

No. 104 A.

No. 1 shanks $\frac{1}{8}$ x $\frac{3}{4}$ inches by $1\frac{1}{4}$ inches long. No. 1 shank furnished on all sizes, unless No. 2 is specified.

Diam., Inches.	Price each, Carbon Steel.	Price each, High Speed Steel.	Length Over All, Inches.	Diam., Inches.	Price each, Carbon Steel.	Price each, High Speed Steel.	Length Over All, Inches.	Diam., Inches.	Price each, Carbon Steel.	Price each, High Speed Steel.	Length Over All, Inches.
$\frac{1}{8}$	\$0 90	.....	4 $\frac{1}{2}$	$\frac{1}{8}$	\$1 65	\$3 80	6 $\frac{1}{2}$	1 $\frac{1}{8}$	\$4 35	\$9 80	9
$\frac{3}{16}$	95	.....	4 $\frac{1}{2}$	$\frac{3}{16}$	1 75	4 00	7	1 $\frac{1}{4}$	4 50	10 20	9
$\frac{1}{4}$	95	.....	4 $\frac{1}{2}$	$\frac{1}{4}$	1 90	4 20	7	1 $\frac{3}{8}$	4 65	10 60	9
$\frac{5}{16}$	1 00	.....	5	$\frac{5}{16}$	2 05	4 50	7 $\frac{1}{2}$	1 $\frac{1}{2}$	4 80	11 00	9
$\frac{3}{8}$	1 05	\$2 50	5	$\frac{3}{8}$	2 20	4 70	7 $\frac{1}{2}$	1 $\frac{5}{8}$	5 00	.....	9 $\frac{1}{2}$
$\frac{7}{16}$	1 10	2 55	5	$\frac{7}{16}$	2 30	5 00	8	1 $\frac{3}{4}$	5 25	.....	9 $\frac{1}{2}$
$\frac{1}{2}$	1 15	2 60	5	$\frac{1}{2}$	2 40	5 25	8	1 $\frac{7}{8}$	5 50	.....	9 $\frac{1}{2}$
$\frac{9}{16}$	1 20	2 65	5	1	2 55	5 50	8 $\frac{1}{2}$	2	5 75	.....	9 $\frac{1}{2}$
$\frac{5}{8}$	1 25	2 70	6	1 $\frac{1}{8}$	2 70	5 75	8 $\frac{1}{2}$	1 $\frac{1}{2}$	6 00	.....	9 $\frac{1}{2}$
$\frac{3}{4}$	1 25	2 75	6 $\frac{1}{2}$	1 $\frac{1}{4}$	2 85	6 00	9	1 $\frac{3}{4}$	6 25	.....	9 $\frac{1}{2}$
$\frac{7}{8}$	1 30	2 80	6 $\frac{1}{2}$	1 $\frac{3}{8}$	3 00	6 30	9	1 $\frac{1}{2}$	6 50	.....	9 $\frac{1}{2}$
$\frac{1}{8}$	1 30	2 85	6 $\frac{1}{2}$	1 $\frac{1}{2}$	3 10	6 70	9	1 $\frac{1}{4}$	6 75	.....	9 $\frac{1}{2}$
$\frac{3}{8}$	1 30	2 90	6 $\frac{1}{2}$	1 $\frac{3}{4}$	3 25	7 00	9	1 $\frac{3}{8}$	6 90	.....	9 $\frac{1}{2}$
$\frac{1}{2}$	1 35	2 95	6 $\frac{1}{2}$	1 $\frac{7}{8}$	3 35	7 30	9	1 $\frac{1}{2}$	7 05	.....	9 $\frac{1}{2}$
$\frac{5}{8}$	1 35	3 00	6 $\frac{1}{2}$	1 $\frac{1}{4}$	3 50	7 60	9	1 $\frac{1}{4}$	7 20	.....	9 $\frac{1}{2}$
$\frac{3}{4}$	1 40	3 10	6 $\frac{1}{2}$	1 $\frac{3}{8}$	3 65	7 90	9	1 $\frac{3}{4}$	7 35	.....	9 $\frac{1}{2}$
$\frac{7}{8}$	1 40	3 20	6 $\frac{1}{2}$	1 $\frac{1}{2}$	3 75	8 25	9	1 $\frac{1}{2}$	7 50	.....	10
$\frac{1}{8}$	1 45	3 30	6 $\frac{1}{2}$	1 $\frac{1}{4}$	3 90	8 60	9	1 $\frac{1}{4}$	7 60	.....	10
$\frac{3}{8}$	1 45	3 40	6 $\frac{1}{2}$	1 $\frac{3}{8}$	4 05	9 00	9	1 $\frac{3}{8}$	7 75	.....	10
$\frac{1}{2}$	1 50	3 50	6 $\frac{1}{2}$	1 $\frac{7}{8}$	4 20	9 40	9	2	7 85	.....	10
$\frac{5}{8}$	1 55	3 65	6 $\frac{1}{2}$								

64th sizes furnished at price next larger.

Discount.....

TAPER SQUARE SHANK DRILLS.

Fitting Ratchets.—No. 2 Shank.



Fig. D. 949.

No. 104 $\frac{1}{2}$ A.

No. 2 shank $\frac{3}{4}$ inch x $\frac{1}{2}$ inch x $1\frac{1}{4}$ inches long. This size shank furnished only when specified. Take same list prices as No. 104 A shown above.

Discount.....

TAPER SHANK TWIST DRILLS.

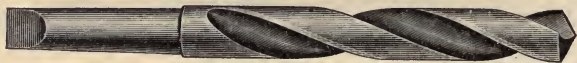


Fig. D. 950.

No. 104.

Diam., Inches.	Price each, Carb'n Steel.	Price each, High Speed Steel.	Length, over all, Inches.	Socket for Standard Taper.	Diam., Inches.	Price each, Carb'n Steel.	Price each, High Speed Steel.	Length, over all, Inches.	Socket for Standard Taper.
$\frac{1}{8}$	\$0 45	\$0 90	5 $\frac{1}{2}$	No. 1, \$1 20.	$\frac{1}{8}$	\$1 70	\$3 25	9 $\frac{1}{2}$	No. 2, \$1 80.
$\frac{1}{8}$	45	90	5 $\frac{1}{2}$		$\frac{1}{8}$	1 70	3 25	9 $\frac{1}{2}$	
$\frac{1}{8}$	50	90	5 $\frac{1}{2}$		$\frac{1}{8}$	1 85	3 50	9 $\frac{1}{2}$	
$\frac{1}{8}$	50	90	5 $\frac{1}{2}$		$\frac{1}{8}$	1 85	3 50	9 $\frac{1}{2}$	
$\frac{1}{8}$	55	1 00	6		$\frac{1}{8}$	2 00	3 75	9 $\frac{1}{2}$	
$\frac{1}{8}$	55	1 00	6		$\frac{1}{8}$	2 00	3 75	9 $\frac{1}{2}$	
$\frac{1}{8}$	60	1 10	6 $\frac{1}{2}$		$\frac{1}{8}$	2 15	4 00	10	
$\frac{1}{8}$	60	1 10	6 $\frac{1}{2}$		$\frac{1}{8}$	2 15	4 00	10	
$\frac{1}{8}$	65	1 20	6 $\frac{1}{2}$		$\frac{1}{8}$	2 30	4 40	10 $\frac{1}{2}$	
$\frac{1}{8}$	65	1 20	6 $\frac{1}{2}$		$\frac{1}{8}$	2 30	4 40	10 $\frac{1}{2}$	
$\frac{1}{8}$	70	1 30	6 $\frac{3}{4}$		$\frac{1}{8}$	2 45	4 75	10 $\frac{1}{2}$	
$\frac{1}{8}$	70	1 30	6 $\frac{3}{4}$		$\frac{1}{8}$	2 45	4 75	10 $\frac{1}{2}$	
$\frac{1}{8}$	75	1 40	6 $\frac{3}{4}$		$\frac{1}{8}$	2 60	5 15	10 $\frac{1}{2}$	
$\frac{1}{8}$	75	1 40	6 $\frac{3}{4}$		$\frac{1}{8}$	2 60	5 15	10 $\frac{1}{2}$	
$\frac{1}{8}$	80	1 50	6 $\frac{3}{4}$		$\frac{1}{8}$	2 75	5 50	10 $\frac{1}{2}$	
$\frac{1}{8}$	80	1 50	6 $\frac{3}{4}$		$\frac{1}{8}$	2 75	5 50	10 $\frac{1}{2}$	
$\frac{1}{8}$	85	1 65	7	No. 2, \$1 80.	$\frac{1}{8}$	2 90	5 90	10 $\frac{1}{2}$	
$\frac{1}{8}$	85	1 65	7		$\frac{1}{8}$	2 90	5 90	10 $\frac{1}{2}$	
$\frac{1}{8}$	90	1 75	7 $\frac{1}{2}$		$\frac{1}{8}$	3 00	6 25	11	
$\frac{1}{8}$	90	1 75	7 $\frac{1}{2}$		$\frac{1}{8}$	3 00	6 25	11	
$\frac{1}{8}$	95	1 90	7 $\frac{1}{2}$		$\frac{1}{8}$	3 20	6 75	11 $\frac{1}{2}$	
$\frac{1}{8}$	95	1 90	7 $\frac{1}{2}$		$\frac{1}{8}$	3 20	6 75	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 00	2 00	7 $\frac{3}{4}$		$\frac{1}{8}$	3 40	7 25	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 00	2 00	7 $\frac{3}{4}$		$\frac{1}{8}$	3 40	7 25	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 10	2 15	8		$\frac{1}{8}$	3 60	7 75	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 10	2 15	8		$\frac{1}{8}$	3 60	7 75	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 20	2 25	8 $\frac{1}{2}$		$\frac{1}{8}$	3 80	8 25	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 20	2 25	8 $\frac{1}{2}$		$\frac{1}{8}$	3 80	8 25	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 30	2 40	8 $\frac{1}{2}$		$\frac{1}{8}$	4 00	8 90	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 30	2 40	8 $\frac{1}{2}$		$\frac{1}{8}$	4 00	8 90	11 $\frac{1}{2}$	
$\frac{1}{8}$	1 40	2 50	8 $\frac{3}{4}$		$\frac{1}{8}$	4 20	9 50	12	
$\frac{1}{8}$	1 40	2 50	8 $\frac{3}{4}$		$\frac{1}{8}$	4 20	9 50	12	
$\frac{1}{8}$	1 50	2 75	9		$\frac{1}{8}$	4 40	10 15	12 $\frac{1}{2}$	
$\frac{1}{8}$	1 50	2 75	9		$\frac{1}{8}$	4 40	10 15	12 $\frac{1}{2}$	
$\frac{1}{8}$	1 60	3 00	9 $\frac{1}{2}$		$\frac{1}{8}$	4 50	10 75	12 $\frac{1}{2}$	
$\frac{1}{8}$	1 60	3 00	9 $\frac{1}{2}$		$\frac{1}{8}$	4 50	10 75	12 $\frac{1}{2}$	

Standard and Morse Tapers the same. Drills furnished with shanks grooved to fit grip sockets, without extra charge.

Discount

Continued on page 481.

TAPER SHANK TWIST DRILLS.

(Continued from page 480.) No. 104.

Diam., Inches.	Price each, Carb'n Steel.	Price ea., High Speed, Steel.	Length over all, Inches.	Socket for Stand'rd Taper.	Diam., Inches.	Price each, Carb'n Steel.	Price ea., High Speed, Steel.	Length over all, Inches.	Socket for Stand'rd Taper.
1 1/16	\$4 65	\$11 50	14 1/2	No. 4, \$4 00.	2 1/8	\$11 20	\$40 00	17	No. 5, \$7 50.
1 1/8	4 65	11 50	14 1/2		2 1/8	11 20	40 00	17	
1 1/4	4 80	12 25	14 1/2		2 3/8	11 60	41 25	17	
1 1/2	4 80	12 25	14 1/2		2 3/8	11 60	41 25	17	
1 3/4	5 00	13 00	14 1/2		2 1/2	12 00	42 50	17	
1 7/8	5 00	13 00	14 1/2		2 1/2	12 00	42 50	17 1/2	
2	5 20	13 75	14 1/2		2 1/2	12 40	43 75	17 1/2	
2 1/16	5 20	13 75	14 1/2		2 1/2	12 40	43 75	17 1/2	
2 1/8	5 40	14 65	14 1/2		2 3/4	12 80	45 00	17 1/2	
2 1/4	5 40	14 65	14 1/2		2 3/4	12 80	45 00	17 1/2	
2 1/2	5 60	15 50	14 1/2		2 1/2	13 20	47 50	17 1/2	
2 3/4	5 60	15 50	14 1/2		2 3/4	13 20	47 50	17 1/2	
2 7/8	5 80	16 40	14 1/2		2 3/4	13 60	50 00	17 1/2	
3	5 80	16 40	14 1/2		2 3/4	13 60	50 00	17 1/2	
3 1/16	6 00	17 25	15		2 1/2	14 00	52 50	18	
3 1/8	6 00	17 25	15		2 1/2	14 00	52 50	18	
3 1/4	6 30	18 15	15 1/2		2 1/2	14 40	55 00	18	
3 1/2	6 30	18 15	15 1/2		2 1/2	14 40	55 00	18	
3 3/4	6 60	19 00	15 1/2		2 1/2	14 70	57 50	18 1/2	
3 7/8	6 60	19 00	15 1/2		2 1/2	14 70	57 50	18 1/2	
4	6 90	20 00	15 1/2		2 1/2	15 00	60 00	19	
4 1/16	6 90	20 00	15 1/2		2 1/2	15 00	60 00	18 1/2	
4 1/8	7 20	21 00	15 1/2		2 1/2	15 30	62 50	19	
4 1/4	7 20	21 00	15 1/2		2 1/2	15 30	62 50	19	
4 1/2	7 50	22 00	15 1/2		2 1/2	15 60	65 00	19	
4 3/4	7 50	22 00	15 1/2		2 1/2	15 60	65 00	19	
4 7/8	7 80	23 00	15 1/2		2 1/2	16 20	70 00	19 1/2	
5	7 80	23 00	15 1/2		2 1/2	16 80	75 00	19 1/2	
5 1/16	8 10	24 00	15 1/2		2 1/2	17 60	80 00	20	
5 1/8	8 10	24 00	15 1/2		2 1/2	19 00	85 00	20 1/2	
5 1/4	8 40	25 00	16		2 1/2	20 00	90 00	20 1/2	
5 1/2	8 40	25 00	16		2 1/2	21 00	95 00	21	
5 3/4	8 60	26 25	16 1/2		2 1/2	23 00	100 00	21	
5 7/8	8 60	26 25	16 1/2		3	25 00	105 00	22	
6	8 80	27 50	16 1/2		3	28 00	112 50	22	
6 1/16	8 80	27 50	16 1/2		3 1/8	31 00	120 00	22	
6 1/8	9 00	28 75	16 1/2		3 1/8	34 00	127 50	22	
6 1/4	9 00	28 75	16 1/2		3 1/8	37 00	135 00	23	
6 1/2	9 20	30 00	16 1/2		3 1/4	40 00	142 50	23	
6 3/4	9 20	30 00	16 1/2		3 1/4	43 00	150 00	23	
6 7/8	9 35	31 25	16 1/2		3 1/4	46 00	157 50	23	
7	9 35	31 25	16 1/2		3 1/2	49 50	165 00	24	
7 1/16	9 50	32 50	16 1/2		3 1/2	53 00	172 50	24	
7 1/8	9 50	32 50	16 1/2		3 1/2	57 00	180 00	24	
7 1/4	9 65	33 75	16 1/2		3 1/2	60 00	187 50	24	
7 1/2	9 65	33 75	16 1/2		3 1/2	63 00	195 00	24	
7 3/4	9 80	35 00	16 1/2		3 1/2	66 00	202 50	24	
7 7/8	9 80	35 00	16 1/2		3 1/2	69 00	210 00	24	
8	10 20	36 25	16 1/2		3 1/2	72 00	217 50	24	
8 1/16	10 20	36 25	16 1/2		4	75 00	225 00	25	
8 1/8	10 60	37 50	17		4 1/8	81 00	.....	25
8 1/4	10 60	37 50	17		4 1/8	87 00	.....	25
8 1/2	10 90	38 75	17		4 3/8	94 00	.....	25
8 3/4	10 90	38 75	17		4 1/2	101 00	.....	26

Discount.....

FORGED TAPER SHANK TWISTED DRILLS.

High Speed.



Fig. D. 951. No. 525.

Diam. Inches.	Price, Each.	Length Over All, Inches.	Socket for Standard Taper.	Diam. Inches.	Price, Each.	Length Over All, Inches.	Socket for Standard Taper.
$\frac{1}{4}$	\$0 95	$6\frac{1}{2}$	No. 1	$\frac{1}{4}$	\$3 00	$10\frac{1}{2}$	No. 3
$\frac{3}{8}$	95	$6\frac{1}{2}$		$\frac{3}{8}$	3 20	11	
$\frac{1}{2}$	95	$6\frac{1}{2}$		$\frac{1}{2}$	3 20	11	
$\frac{5}{8}$	1 00	$6\frac{3}{4}$		$\frac{5}{8}$	3 45	11	
$\frac{3}{4}$	1 00	$6\frac{3}{4}$		$\frac{3}{4}$	3 45	11	
$\frac{7}{8}$	1 00	$6\frac{3}{4}$		$\frac{7}{8}$	3 75	$11\frac{1}{2}$	
1	1 00	$6\frac{3}{4}$		1	3 75	$11\frac{1}{2}$	
$1\frac{1}{8}$	1 05	$6\frac{1}{2}$		$1\frac{1}{8}$	4 05	$11\frac{1}{2}$	
$1\frac{1}{4}$	1 05	$6\frac{1}{2}$		$1\frac{1}{4}$	4 05	$11\frac{1}{2}$	
$1\frac{3}{8}$	1 10	7		$1\frac{3}{8}$	4 35	12	
$1\frac{1}{2}$	1 10	7		$1\frac{1}{2}$	4 35	12	
$1\frac{5}{8}$	1 15	$7\frac{1}{2}$		$1\frac{5}{8}$	4 75	12	
$1\frac{3}{4}$	1 15	$7\frac{1}{2}$		$1\frac{3}{4}$	5 10	12	
2	1 20	$7\frac{1}{2}$	No. 2	2	5 45	13	No. 4
$2\frac{1}{8}$	1 20	$7\frac{1}{2}$		$2\frac{1}{8}$	5 80	13	
$2\frac{1}{4}$	1 30	8		$2\frac{1}{4}$	6 20	$13\frac{1}{4}$	
$2\frac{3}{8}$	1 30	8		$2\frac{3}{8}$	6 55	$13\frac{1}{4}$	
$2\frac{1}{2}$	1 40	$8\frac{1}{2}$		$2\frac{1}{2}$	6 90	$13\frac{1}{4}$	
$2\frac{5}{8}$	1 40	$8\frac{1}{4}$		$2\frac{5}{8}$	7 20	$13\frac{3}{4}$	
$2\frac{3}{4}$	1 50	$8\frac{3}{4}$		$2\frac{3}{4}$	7 60	$13\frac{3}{4}$	
$2\frac{7}{8}$	1 50	$8\frac{3}{4}$		$2\frac{7}{8}$	8 00	$13\frac{3}{4}$	
3	1 60	$8\frac{3}{4}$		3	8 40	14	
$3\frac{1}{8}$	1 60	$8\frac{3}{4}$		$3\frac{1}{8}$	8 80	14	
$3\frac{1}{4}$	1 75	9		$3\frac{1}{4}$	9 20	$14\frac{1}{4}$	
$3\frac{3}{8}$	1 75	9		$3\frac{3}{8}$	9 60	$14\frac{1}{4}$	
$3\frac{1}{2}$	1 90	$9\frac{1}{4}$	No. 3	$3\frac{1}{2}$	10 00	$14\frac{1}{2}$	No. 5
$3\frac{5}{8}$	1 90	$9\frac{1}{4}$		$3\frac{5}{8}$	10 40	$14\frac{1}{2}$	
$3\frac{3}{4}$	2 05	$9\frac{1}{2}$		$3\frac{3}{4}$	10 80	$15\frac{1}{2}$	
$3\frac{7}{8}$	2 05	$9\frac{1}{2}$		$3\frac{7}{8}$	11 20	$15\frac{1}{2}$	
4	2 25	$9\frac{1}{2}$		4	11 65	$15\frac{1}{2}$	
$4\frac{1}{8}$	2 25	$9\frac{1}{2}$		$4\frac{1}{8}$	12 10	$15\frac{1}{2}$	
$4\frac{1}{4}$	2 40	10		$4\frac{1}{4}$	12 60	$15\frac{3}{4}$	
$4\frac{3}{8}$	2 40	10		$4\frac{3}{8}$	13 05	$16\frac{1}{8}$	
$4\frac{1}{2}$	2 60	10		$4\frac{1}{2}$	13 60	$16\frac{1}{8}$	
$4\frac{5}{8}$	2 60	10		$4\frac{5}{8}$	14 10	$16\frac{3}{8}$	
$4\frac{3}{4}$	2 80	$10\frac{1}{2}$		$4\frac{3}{4}$	14 55	$16\frac{3}{8}$	
$4\frac{7}{8}$	2 80	$10\frac{1}{2}$		$4\frac{7}{8}$	15 00	$16\frac{3}{8}$	
5	3 00	$10\frac{1}{2}$		5	15 50	17	

Discount

Continued on page 483.

FORGED TAPER SHANK TWISTED DRILLS.

Continued from page 482.

High Speed—No. 525.

Diam., Inches.	Price, each.	Length, Inches.	Socket for Standard Taper.	Diam., Inches.	Price, each.	Length, Inches.	Socket for Standard Taper.
1 $\frac{1}{8}$	\$16 00	17	No. 5	2 $\frac{1}{8}$	\$27 80	19 $\frac{1}{2}$	* No. 5
1 $\frac{1}{4}$	16 55	17		2 $\frac{1}{2}$	29 20	19 $\frac{1}{2}$	
1 $\frac{3}{4}$	17 10	17		2 $\frac{3}{4}$	30 60	19 $\frac{1}{2}$	
1 $\frac{1}{2}$	17 65	17		2 $\frac{5}{8}$	32 00	20 $\frac{1}{2}$	
2	18 20	17 $\frac{1}{2}$		2 $\frac{7}{8}$	34 00	20 $\frac{1}{2}$	
2 $\frac{1}{4}$	19 50	17 $\frac{3}{4}$		2 $\frac{3}{4}$	36 00	20 $\frac{1}{2}$	
2 $\frac{1}{2}$	20 80	17 $\frac{1}{2}$		2 $\frac{1}{2}$	38 00	21 $\frac{1}{2}$	
2 $\frac{3}{4}$	22 20	18 $\frac{1}{2}$		2 $\frac{1}{2}$	40 00	21 $\frac{1}{2}$	
2 $\frac{1}{2}$	23 60	18 $\frac{3}{4}$		2 $\frac{1}{2}$	42 50	21 $\frac{1}{2}$	
2 $\frac{3}{4}$	25 00	19 $\frac{1}{2}$		3	45 00	21 $\frac{1}{2}$	
2 $\frac{1}{2}$	26 40	19 $\frac{1}{2}$	*				

*No. 6 if desired.

Discount.....

FLAT TRACK DRILLS. **$\frac{5}{8}$ -Inch Round Shank. High Speed.**

Fig. D. 952. No. 523.

Size of shank about $\frac{5}{8}$ inch (.647 exact) diameter and 2 $\frac{1}{4}$ inches long.

Diameter, Inches.	Price, each.	Length Over All, Inches.	Diameter, Inches.	Price, each.	Length Over All, Inches.
$\frac{5}{8}$	\$0 95	6 $\frac{1}{2}$	1 $\frac{1}{8}$	\$1 50	6 $\frac{1}{2}$
$\frac{3}{4}$	1 05	6 $\frac{1}{2}$	1 $\frac{1}{4}$	1 60	6 $\frac{1}{2}$
$\frac{1}{2}$	1 15	6 $\frac{1}{2}$	1 $\frac{3}{8}$	1 70	6 $\frac{1}{2}$
$\frac{1}{4}$	1 20	6 $\frac{1}{2}$	1 $\frac{1}{2}$	1 85	6 $\frac{1}{2}$
$\frac{1}{8}$	1 30	6 $\frac{1}{2}$	1 $\frac{1}{2}$	2 25	6 $\frac{1}{2}$
1	1 40	6 $\frac{1}{2}$			

Discount.....

BONDING DRILLS.**High Speed.**

Fig. D. 953. No. 522.

For Drilling Bond Wire Holes for Track Circuit Signal Work.

Diameter, Inches.	Length, Inches.	Length Shank, Inches.	Price, Per Dozen.
$\frac{3}{32}$	3	1 $\frac{1}{2}$	\$9 10

See also page 83.

Discount.....

STANDARD STRAIGHT SHANK TWIST DRILLS.

Taper Shank Lengths.

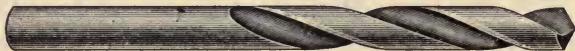


Fig. D. 954.

No. 104 B.

Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.
$\frac{1}{8}$	\$0 45	\$0 90	5 $\frac{1}{2}$	$\frac{5}{8}$	\$1 40	\$2 50	8 $\frac{1}{2}$
$\frac{1}{4}$	45	90	5 $\frac{3}{4}$	$\frac{7}{8}$	1 50	2 75	9
$\frac{3}{8}$	45	90	5 $\frac{3}{4}$	1	1 50	2 75	9
$\frac{1}{2}$	50	90	5 $\frac{3}{4}$	1 $\frac{1}{8}$	1 60	3 00	9 $\frac{1}{2}$
$\frac{5}{8}$	50	90	5 $\frac{3}{4}$	1 $\frac{1}{4}$	1 60	3 00	9 $\frac{1}{2}$
$\frac{3}{4}$	55	1 00	6	1 $\frac{3}{8}$	1 70	3 25	9 $\frac{1}{2}$
$\frac{7}{8}$	55	1 00	6	1 $\frac{1}{2}$	1 70	3 25	9 $\frac{1}{2}$
1	60	1 10	6 $\frac{1}{2}$	1 $\frac{5}{8}$	1 85	3 50	9 $\frac{1}{2}$
1 $\frac{1}{8}$	60	1 10	6 $\frac{1}{2}$	1 $\frac{3}{4}$	1 85	3 50	9 $\frac{1}{2}$
1 $\frac{1}{4}$	65	1 20	6 $\frac{1}{2}$	1 $\frac{7}{8}$	2 00	3 75	9 $\frac{1}{2}$
1 $\frac{3}{8}$	65	1 20	6 $\frac{1}{2}$	2	2 00	3 75	9 $\frac{1}{2}$
1 $\frac{1}{2}$	70	1 30	6 $\frac{1}{2}$	2 $\frac{1}{8}$	2 15	4 00	10
1 $\frac{3}{4}$	70	1 30	6 $\frac{1}{2}$	2 $\frac{1}{4}$	2 15	4 00	10
2	75	1 40	6 $\frac{1}{2}$	2 $\frac{3}{8}$	2 30	4 40	10 $\frac{1}{2}$
2 $\frac{1}{8}$	75	1 40	6 $\frac{1}{2}$	2 $\frac{1}{2}$	2 30	4 40	10 $\frac{1}{2}$
2 $\frac{1}{4}$	80	1 50	6 $\frac{1}{2}$	2 $\frac{5}{8}$	2 45	4 75	10 $\frac{1}{2}$
2 $\frac{3}{8}$	80	1 50	6 $\frac{1}{2}$	2 $\frac{3}{4}$	2 45	4 75	10 $\frac{1}{2}$
2 $\frac{1}{2}$	85	1 65	7	2 $\frac{7}{8}$	2 60	5 15	10 $\frac{1}{2}$
2 $\frac{3}{4}$	85	1 65	7	3	2 60	5 15	10 $\frac{1}{2}$
3	90	1 75	7 $\frac{1}{2}$	3 $\frac{1}{8}$	2 75	5 50	10 $\frac{1}{2}$
3 $\frac{1}{8}$	90	1 75	7 $\frac{1}{2}$	3 $\frac{1}{4}$	2 75	5 50	10 $\frac{1}{2}$
3 $\frac{1}{4}$	95	1 90	7 $\frac{1}{2}$	3 $\frac{3}{8}$	2 90	5 90	10 $\frac{1}{2}$
3 $\frac{1}{2}$	95	1 90	7 $\frac{1}{2}$	3 $\frac{1}{2}$	2 90	5 90	10 $\frac{1}{2}$
4	1 00	2 00	7 $\frac{1}{2}$	3 $\frac{5}{8}$	3 00	6 25	11
4 $\frac{1}{8}$	1 00	2 00	7 $\frac{1}{2}$	4	3 00	6 25	11
4 $\frac{1}{4}$	1 10	2 15	8	4 $\frac{1}{8}$	3 20	6 75	11 $\frac{1}{2}$
4 $\frac{3}{8}$	1 10	2 15	8	4 $\frac{1}{4}$	3 20	6 75	11 $\frac{1}{2}$
4 $\frac{1}{2}$	1 20	2 25	8 $\frac{1}{2}$	4 $\frac{3}{8}$	3 40	7 25	11 $\frac{1}{2}$
5	1 20	2 25	8 $\frac{1}{2}$	4 $\frac{1}{2}$	3 40	7 25	11 $\frac{1}{2}$
5 $\frac{1}{8}$	1 30	2 40	8 $\frac{1}{2}$	4 $\frac{3}{4}$	3 60	7 75	11 $\frac{1}{2}$
5 $\frac{1}{4}$	1 30	2 40	8 $\frac{1}{2}$	5	3 60	7 75	11 $\frac{1}{2}$
5 $\frac{3}{8}$	1 40	2 50	8 $\frac{1}{2}$	5 $\frac{1}{8}$	3 80	8 25	11 $\frac{1}{2}$

Discount.....

Continued on page 485.

STANDARD STRAIGHT SHANK TWIST DRILLS.

Taper Shank Lengths.

No. 104 B.

Continued from page 484.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length, Inches.	Diameter, Inches.	Price Each, Carbon Steel.	Price, Each, High Speed Steel.	Length, Inches.
1 1/8	\$3 80	\$ 8 25	11 3/4	1 3/4	\$ 8 40	\$25 00	16
1 1/8	4 00	8 90	11 3/4	1 3/4	8 60	26 25	16 1/2
1 1/8	4 00	8 90	11 3/4	1 3/4	8 80	27 50	16 1/2
1 1/8	4 20	9 50	12	1 3/4	9 00	28 75	16 1/2
1 1/8	4 20	9 50	12	1 3/4	9 20	30 00	16 1/2
1 1/8	4 40	10 15	12 1/4	1 3/4	9 35	31 25	16 1/2
1 1/8	4 40	10 15	12 1/4	1 3/4	9 50	32 50	16 1/2
1 1/8	4 50	10 75	12 1/4	1 3/4	9 65	33 75	16 1/2
1 1/8	4 50	10 75	12 1/4	2	9 80	35 00	16 1/2
1 1/8	4 65	11 50	14 1/4	2 1/8	10 20	36 25	16 1/2
1 1/8	4 65	11 50	14 1/4	2 1/8	10 60	37 50	17
1 1/8	4 80	12 25	14 1/4	2 1/8	10 90	38 75	17
1 1/8	4 80	12 25	14 1/4	2 1/8	11 20	40 00	17
1 1/8	5 00	13 00	14 1/4	2 1/8	11 60	41 25	17
1 1/8	5 00	13 00	14 1/4	2 1/8	12 00	42 50	17
1 1/8	5 20	13 75	14 1/4	2 1/8	12 40	43 75	17 1/2
1 1/8	5 20	13 75	14 1/4	2 1/8	12 80	45 00	17 1/2
1 1/8	5 40	14 65	14 1/4	2 1/8	13 20	47 50	17 1/2
1 1/8	5 40	14 65	14 1/4	2 1/8	13 60	50 00	17 1/2
1 1/8	5 60	15 50	14 1/4	2 1/8	14 00	52 50	18
1 1/8	5 60	15 50	14 1/4	2 1/8	14 40	55 00	18
1 1/8	5 80	16 40	14 1/4	2 1/8	14 70	57 50	18 1/2
1 1/8	5 80	16 40	14 1/4	2 1/8	15 00	60 00	18 1/2
1 1/8	6 00	17 25	15	2 1/8	15 30	62 50	19
1 1/8	6 00	17 25	15	2 1/8	15 60	65 00	19
1 1/8	6 30	18 15	15 1/4	2 1/8	16 20	70 00	19 1/2
1 1/8	6 60	19 00	15 1/4	2 1/8	16 80	75 00	19 1/2
1 1/8	6 90	20 00	15 3/4	2 1/8	17 60	80 00	20
1 1/8	7 20	21 00	15 3/4	2 1/8	19 00	85 00	20 1/2
1 1/8	7 50	22 00	15 3/4	2 1/8	20 00	90 00	20 1/2
1 1/8	7 80	23 00	15 3/4	2 1/8	21 00	95 00	21
1 1/8	8 10	24 00	15 3/4	3	25 00	105 00	22

32d sizes not listed are furnished at prices intermediate, and 64th sizes at price of next larger size.

Discount.....

STRAIGHT SHANK TWIST DRILLS.

Jobbers' or Short Lengths.



Fig. D. 955.

No. 105.

Diameter, Inches.	Length Over All, Inches.	Carbon Steel.		High Speed Steel, Per Dozen.
		Price, Per Dozen.	Price, Each.	
1/32	1 1/2	\$0 90	\$0 08	.....
1/16	1 1/2	95	09	.....
3/32	2 1/2	1 00	09	\$12 00
1/8	2 1/2	1 10	10	10 00
5/32	2 1/2	1 20	11	9 00
3/16	2 1/2	1 30	12	9 00
1/4	3	1 45	13	8 50
5/16	3 1/2	1 60	15	8 50
3/8	3 1/2	1 80	16	7 50
7/16	3 3/4	2 00	18	7 50
1/2	3 3/4	2 20	20	6 50
5/8	3 3/4	2 40	21	7 35
3/4	3 3/4	2 65	23	7 35
7/8	3 3/4	2 90	26	7 35
1	4	3 15	28	7 35
1 1/8	4 1/2	3 40	30	9 10
1 1/4	4 1/2	3 65	32	9 10
1 1/2	4 1/2	3 90	35	10 50
1 3/4	4 1/2	4 20	37	10 50
2	4 1/2	4 50	40	12 00
2 1/8	4 1/2	4 80	42	12 00
2 1/4	4 1/2	5 10	45	13 50
2 1/2	5	5 40	48	13 50
2 3/4	5 1/2	5 70	50	15 00
3	5 1/2	6 00	53	15 00
3 1/8	5 1/2	6 40	55	17 00
3 1/4	5 1/2	6 80	59	17 00
3 1/2	5 1/2	7 20	63	18 75
3 3/4	5 1/2	7 50	65	18 75
4	5 1/2	7 75	67	20 00
4 1/2	6	8 00	70	20 00

Discount.....

STRAIGHT SHANK TWIST DRILLS.

Letter Sizes.



Fig. D. 956.

No. 106.

Size.	Length Over All, Inches.	Carbon Steel.		High Speed Steel, Price Per Dozen.
		Price, Per Dozen.	Price, Each.	
A	3 $\frac{1}{8}$	\$2 90	\$0 26	\$7 35
B	3 $\frac{1}{4}$	3 00	27	7 35
C	3 $\frac{3}{8}$	3 10	28	7 35
D	3 $\frac{1}{2}$	3 20	29	7 35
E	3 $\frac{5}{8}$	3 30	30	7 35
F	4 $\frac{1}{8}$	3 40	30	9 10
G	4 $\frac{1}{4}$	3 50	31	9 10
H	4 $\frac{3}{8}$	3 60	32	9 10
I	4 $\frac{1}{2}$	3 70	33	9 10
J	4 $\frac{3}{4}$	3 80	34	9 10
K	4 $\frac{7}{8}$	3 90	35	9 10
L	4 $\frac{15}{16}$	4 00	36	10 50
M	4 $\frac{1}{2}$	4 10	36	10 50
N	4 $\frac{1}{2}$	4 20	37	10 50
O	4 $\frac{1}{2}$	4 30	38	10 50
P	4 $\frac{1}{2}$	4 40	39	12 00
Q	4 $\frac{1}{2}$	4 60	40	12 00
R	4 $\frac{1}{2}$	4 80	42	12 00
S	4 $\frac{1}{2}$	5 00	44	13 50
T	4 $\frac{1}{2}$	5 20	45	13 50
U	5	5 40	47	13 50
V	5	5 60	49	13 50
W	5 $\frac{1}{8}$	5 80	51	15 00
X	5 $\frac{1}{4}$	6 00	53	15 00
Y	5 $\frac{3}{8}$	6 40	55	15 00
Z	5 $\frac{1}{2}$	6 80	59	17 00

Discount.....

STUBS' STEEL WIRE GAUGE DRILLS.



Fig. D. 957.

No. 107.

Numbers by Gauge.	Decimals of Inch.	Length Over All, Inches.	Carbon Steel.		High Speed Steel, Price Per Dozen.	Numbers by Gauge.	Decimals of Inch.	Length Over All, Inches.	Carbon Steel.		High Speed Steel, Price Per Dozen.
			Price, Per Dozen.	Price, Each.					Price, Per Dozen.	Price, Each.	
1	.2280	4	\$2 35	0 22	7 35	41	.0960	2 $\frac{1}{16}$	\$1 10	0 10	9 00
2	.2210	3 $\frac{3}{8}$	2 35	22	7 35	42	.0935	2 $\frac{1}{8}$	1 10	10	10 00
3	.2130	3 $\frac{1}{2}$	2 35	22	7 35	43	.0890	2 $\frac{1}{4}$	1 10	10	10 00
4	.2090	3 $\frac{1}{4}$	2 35	22	7 35	44	.0860	2 $\frac{3}{8}$	1 10	10	10 00
5	.2055	3 $\frac{1}{8}$	2 35	22	7 35	45	.0820	2 $\frac{1}{2}$	1 10	10	10 00
6	.2040	3 $\frac{1}{4}$	2 25	21	7 35	46	.0810	2 $\frac{1}{8}$	95	09	10 00
7	.2010	3 $\frac{1}{8}$	2 25	21	7 35	47	.0785	2 $\frac{1}{4}$	95	09	10 00
8	.1990	3 $\frac{1}{4}$	2 25	21	7 35	48	.0760	2 $\frac{3}{8}$	95	09	12 00
9	.1960	3 $\frac{1}{2}$	2 25	21	7 35	49	.0730	2	95	09	12 00
10	.1935	3 $\frac{5}{8}$	2 25	21	7 35	50	.0700	1 $\frac{1}{8}$	95	09	12 00
11	.1910	3 $\frac{3}{4}$	2 10	20	7 35	51	.0670	1 $\frac{1}{4}$	95	09	12 00
12	.1890	3 $\frac{1}{2}$	2 10	20	7 35	52	.0635	1 $\frac{3}{8}$	95	09	12 00
13	.1850	3 $\frac{1}{4}$	2 10	20	7 50	53	.0595	1 $\frac{1}{2}$	95	09	.....
14	.1820	3 $\frac{1}{8}$	2 10	20	7 50	54	.0550	1 $\frac{3}{4}$	95	09	.....
15	.1800	3 $\frac{1}{4}$	2 10	20	7 50	55	.0520	1 $\frac{1}{2}$	95	09	.....
16	.1770	3 $\frac{1}{8}$	1 95	19	7 50	56	.0465	1 $\frac{1}{4}$	95	09	.....
17	.1730	3 $\frac{1}{4}$	1 95	19	7 50	57	.0430	1 $\frac{3}{8}$	95	09	.....
18	.1695	3 $\frac{1}{2}$	1 95	19	7 50	58	.0420	1 $\frac{1}{2}$	95	09	.....
19	.1660	3 $\frac{3}{4}$	1 95	19	7 50	59	.0410	1 $\frac{3}{4}$	95	09	.....
20	.1610	3 $\frac{1}{2}$	1 95	19	7 50	60	.0400	1 $\frac{1}{4}$	95	09	.....
21	.1590	3 $\frac{1}{4}$	1 75	17	7 50	61	.0380	1 $\frac{3}{8}$	90	08	.....
22	.1570	3 $\frac{1}{8}$	1 75	17	7 50	62	.0370	1 $\frac{1}{2}$	90	08	.....
23	.1540	3 $\frac{1}{4}$	1 75	17	8 50	63	.0360	1 $\frac{3}{4}$	90	08	.....
24	.1520	3 $\frac{1}{2}$	1 75	17	8 50	64	.0350	1 $\frac{1}{2}$	90	08	.....
25	.1495	3	1 75	17	8 50	65	.0330	1 $\frac{3}{8}$	90	08	.....
26	.1470	2 $\frac{1}{4}$	1 55	15	8 50	66	.0320	1 $\frac{1}{2}$	90	08	.....
27	.1440	2 $\frac{1}{8}$	1 55	15	8 50	67	.0310	1 $\frac{3}{4}$	90	08	.....
28	.1405	2 $\frac{1}{4}$	1 55	15	8 50	68	.0300	1 $\frac{1}{4}$	90	08	.....
29	.1360	2 $\frac{1}{8}$	1 55	15	8 50	69	.0290	1 $\frac{3}{8}$	90	08	.....
30	.1285	2 $\frac{1}{4}$	1 55	15	8 50	70	.0270	1 $\frac{1}{2}$	90	08	.....
31	.1200	2 $\frac{3}{4}$	1 40	14	9 00	71	.0260	1 $\frac{3}{4}$	1 00	09	.....
32	.1160	2 $\frac{1}{2}$	1 40	14	9 00	72	.0240	1 $\frac{1}{4}$	1 00	09	.....
33	.1130	2 $\frac{1}{4}$	1 40	14	9 00	73	.0230	1 $\frac{3}{8}$	1 00	09	.....
34	.1110	2 $\frac{5}{8}$	1 40	14	9 00	74	.0220	1 $\frac{1}{2}$	1 00	09	.....
35	.1100	2 $\frac{1}{2}$	1 40	14	9 00	75	.0200	1 $\frac{3}{4}$	1 00	09	.....
36	.1065	2 $\frac{1}{4}$	1 25	12	9 00	76	.0180	1	1 00	09	.....
37	.1040	2 $\frac{1}{2}$	1 25	12	9 00	77	.0160	$\frac{1}{8}$	1 00	09	.....
38	.1015	2 $\frac{1}{4}$	1 25	12	9 00	78	.0150	$\frac{1}{4}$	1 00	09	.....
39	.0995	2 $\frac{1}{8}$	1 25	12	9 00	79	.0140	$\frac{1}{2}$	1 00	09	.....
40	.0980	2 $\frac{3}{8}$	1 25	12	9 00	80	.0130	$\frac{3}{4}$	1 00	09	.....

Discount.....

DRILL AND COUNTERSINK COMBINED.



Fig. D. 958.

No. 107 D.

Angle of Countersink, 60°.

Size.	Diameter of Body, Inches.	Diameter of Drill, Inches.	Price, Per Dozen.
A	$\frac{3}{16}$	$\frac{3}{16}$ and $\frac{1}{8}$	\$1 50
B	$\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	1 50
C	$\frac{1}{8}$	$\frac{3}{16}$ and $\frac{3}{16}$	1 50
D	$\frac{1}{8}$	No. 49 and No. 45	1 50
E	$\frac{1}{8}$	$\frac{1}{8}$ and No. 45	1 50
F	$\frac{1}{8}$	$\frac{3}{16}$ and $\frac{3}{16}$	3 00
G	$\frac{1}{8}$	$\frac{1}{8}$ and $\frac{1}{8}$	3 00
H	$\frac{1}{8}$	$\frac{1}{8}$ and $\frac{3}{16}$	3 00

No. 107 $\frac{1}{2}$ D.

AA	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{7}{16}$	\$4 60
BB	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{7}{16}$	4 60
CC	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{9}{16}$	4 60
DD	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{1}{2}$	5 00
EE	$\frac{1}{2}$	$\frac{9}{16}$ and $\frac{1}{2}$	5 00
FF	$\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	5 00

No. 107 G.

GG	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{7}{16}$	\$7 25
HH	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{9}{16}$	7 25
II	$\frac{1}{2}$	$\frac{7}{16}$ and $\frac{1}{2}$	7 25
JJ	$\frac{1}{2}$	$\frac{9}{16}$ and $\frac{1}{2}$	7 75
KK	$\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	7 75
LL	$\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{2}$	7 75

An inexpensive double-ended tool for drilling and countersinking tires and wagon irons at one operation. Body $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in., diameter. Fitting directly into the spindle of blacksmiths' drill presses. Slabbed or flattened for set screw or drill press.

Discount.....

WITH No. 1 STANDARD TAPER SHANK.

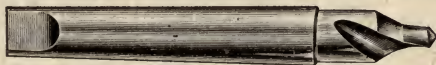


Fig. D. 959.

No. 107 E.

Angle of Countersink, 60°.

Size.	Diameter of Body.	Diameter of Drill.	Price, Each.
M	$\frac{1}{16}$	$\frac{1}{16}$	\$0 75
N	$\frac{1}{16}$	$\frac{3}{32}$	75
O	$\frac{1}{16}$	$\frac{1}{8}$	75
P	$\frac{1}{16}$	$\frac{3}{16}$	75
Q	$\frac{1}{16}$	$\frac{1}{2}$	75

Discount.....

BIT STOCK DRILLS.

For Metal or Wood.



Fig. D. 960.

Size of Shanks $\frac{3}{16} \times \frac{3}{8} \times 1\frac{1}{2}$ inches long.

Diam., Inches.	Length Over All, Inches.	Price, Per Doz.	Price, Each.	Diam., Inches.	Length Over All, Inches.	Price, Per Doz.	Price, Each.
$\frac{1}{16}$	$2\frac{7}{8}$	\$1 25	\$0 12	$\frac{14}{32}$	$6\frac{1}{2}$	\$ 8 80	\$0 75
$\frac{1}{8}$	3	1 40	13	$\frac{15}{32}$	$6\frac{1}{4}$	9 60	82
$\frac{3}{16}$	$3\frac{1}{8}$	1 50	14	$\frac{16}{32}$	7	10 30	87
$\frac{1}{4}$	$3\frac{1}{4}$	1 60	15	$\frac{17}{32}$	$7\frac{3}{8}$	11 00	92
$\frac{5}{16}$	$3\frac{1}{2}$	1 65	16	$\frac{18}{32}$	$7\frac{5}{8}$	14 35	1 20
$\frac{3}{8}$	$3\frac{3}{4}$	1 90	18	$\frac{19}{32}$	$7\frac{7}{8}$	15 55	1 30
$\frac{7}{16}$	$3\frac{7}{8}$	2 10	20	$\frac{20}{32}$	8	16 15	1 35
$\frac{1}{2}$	4	2 35	22	$\frac{21}{32}$	8	17 35	1 45
$\frac{9}{16}$	$4\frac{1}{4}$	2 60	24	$\frac{22}{32}$	8	17 95	1 50
$\frac{5}{8}$	$4\frac{3}{8}$	2 85	26	$\frac{23}{32}$	8	19 15	1 60
$\frac{11}{16}$	$4\frac{1}{2}$	3 10	29	$\frac{24}{32}$	8	19 75	1 65
$\frac{3}{4}$	$4\frac{3}{4}$	3 35	31	$\frac{25}{32}$	8	20 95	1 75
$\frac{13}{16}$	$4\frac{7}{8}$	3 60	33	$\frac{26}{32}$	8	21 55	1 80
$\frac{7}{8}$	5	3 85	36	$\frac{27}{32}$	8	22 75	1 90
$\frac{15}{16}$	$5\frac{1}{8}$	4 10	38	$\frac{28}{32}$	8	23 35	1 95
$\frac{1}{1}$	$5\frac{3}{8}$	4 40	41	$\frac{29}{32}$	8	24 55	2 05
$\frac{17}{16}$	$5\frac{1}{2}$	4 70	43	$\frac{30}{32}$	8	25 75	2 15
$\frac{19}{16}$	$5\frac{5}{8}$	5 05	46	$\frac{31}{32}$	8	26 95	2 25
$\frac{21}{16}$	$5\frac{3}{4}$	5 40	48	1	8	28 15	2 35
$\frac{23}{16}$	$5\frac{7}{8}$	5 85	51	$1\frac{1}{16}$	8	35 95	3 00
$\frac{25}{16}$	$5\frac{7}{8}$	6 30	54	$1\frac{1}{8}$	8	40 15	3 35
$\frac{27}{16}$	6	7 20	62	$1\frac{1}{4}$	8	43 15	3 60
$\frac{29}{16}$	$6\frac{1}{4}$	8 00	68	$1\frac{1}{2}$	8	44 95	3 75

Our bit stock drills will fit any brace on the market. They are intended principally for wood boring, but can be used to drill iron or other metals. They are not injured by contact with screws or nails, and will bore straight, any kind of wood without splitting it. Sizes larger than $\frac{3}{4}$ are made with solid shanks.

Discount

COE'S TWIST DRILLS.

$\frac{5}{8}$ -Inch Shanks, Short Lengths, Fitting Blacksmiths' Drill Presses.



Fig. D. 961.

No. 110.

Size of shank about $\frac{5}{8}$ inch (.647 exact) diameter and $2\frac{1}{4}$ inches long.

Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
$\frac{1}{8}$	$4\frac{1}{2}$	\$0 55	.....	$\frac{3}{32}$	6	\$1 70	\$3 90
$\frac{1}{16}$	$5\frac{1}{2}$	58	.....	1	6	1 80	4 10
$\frac{1}{16}$	$5\frac{1}{2}$	60	.....	$\frac{1}{16}$	6	1 90	4 30
$\frac{1}{16}$	$5\frac{1}{2}$	65	.....	$\frac{1}{16}$	6	2 00	4 50
$\frac{1}{4}$	6	70	\$1 20	$\frac{1}{8}$	6	2 10	4 75
$\frac{1}{4}$	6	73	1 30	$\frac{1}{8}$	6	2 20	5 00
$\frac{1}{4}$	6	75	1 40	$\frac{1}{8}$	6	2 25	5 25
$\frac{1}{4}$	6	80	1 50	$\frac{1}{8}$	6	2 30	5 50
$\frac{1}{4}$	6	85	1 55	$\frac{1}{8}$	6	2 35	5 80
$\frac{1}{4}$	6	88	1 65	$\frac{1}{4}$	6	2 40	6 10
$\frac{1}{4}$	6	90	1 70	$\frac{1}{4}$	6	2 50	6 40
$\frac{1}{4}$	6	93	1 80	$\frac{1}{4}$	6	2 60	6 70
$\frac{1}{4}$	6	95	1 85	$\frac{1}{4}$	6	2 70	7 00
$\frac{1}{4}$	6	98	1 95	$\frac{1}{4}$	6	2 80	7 40
$\frac{1}{4}$	6	1 00	2 05	$\frac{1}{4}$	6	2 90	7 80
$\frac{1}{4}$	6	1 03	2 20	$\frac{1}{4}$	6	3 00	8 20
$\frac{1}{4}$	6	1 05	2 30	$\frac{1}{4}$	6	3 10	8 60
$\frac{1}{4}$	6	1 10	2 40	$\frac{1}{2}$	6	3 20	9 00
$\frac{1}{4}$	6	1 15	2 50	$\frac{1}{2}$	6	3 40	.....
$\frac{1}{4}$	6	1 20	2 65	$\frac{1}{2}$	6	3 60	.....
$\frac{1}{4}$	6	1 25	2 75	$\frac{1}{2}$	6	3 80	.....
$\frac{1}{4}$	6	1 30	2 90	$\frac{1}{2}$	6	4 05	.....
$\frac{1}{4}$	6	1 35	3 00	$\frac{1}{2}$	6	4 30	.....
$\frac{1}{4}$	6	1 40	3 15	$\frac{1}{2}$	6	4 50	.....
$\frac{1}{4}$	6	1 45	3 30	$\frac{1}{2}$	6	4 75	.....
$\frac{1}{4}$	6	1 55	3 50	2	6	5 00	.....
$\frac{1}{4}$	6	1 60	3 70				

32nd sizes not listed, furnished at prices intermediate.
64th sizes furnished at price of next larger size.

Discount.

TWIST DRILLS.

Prentice Drills, ½-Inch Shanks, Taper Shank Lengths.
Fitting Blacksmiths' Drill Presses.



Fig. D. 962.
No. 111.

Size of Shank ½ inch diameter and 2 ½ inches long.

Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
1/8	5 1/2	\$0 45	.....	27/64	9 1/2	\$2 30	\$4 40
5/16	5 3/4	45	.....	7/8	9 3/4	2 45	4 75
3/8	5 7/8	50	.....	15/16	9 1/2	2 60	5 15
1/2	6	55	.....	1 1/16	9 1/2	2 75	5 50
5/8	6 1/8	60	\$1 10	1 1/8	9 3/4	2 90	5 90
3/4	6 1/4	65	1 20	1 1/4	9 1/2	3 00	6 25
7/8	6 3/4	70	1 30	1 3/8	10	3 20	6 75
15/16	6 7/8	75	1 40	1 1/2	10	3 40	7 25
1	6 3/4	80	1 50	1 5/8	10	3 60	7 75
1 1/8	7	85	1 65	1 3/4	10	3 80	8 25
1 1/4	7 1/4	90	1 75	1 7/8	10	4 00	8 90
1 1/2	7 1/2	95	1 90	1 5/4	10	4 20	9 50
1 3/4	7 3/4	1 00	2 00	1 11/16	10	4 40	10 15
1 7/8	8	1 10	2 15	1 3/4	10	4 50	10 75
2	8 1/4	1 20	2 25	1 5/8	10 1/2	4 65	11 50
2 1/8	8 1/2	1 30	2 40	1 3/2	10 1/2	4 80	12 25
2 1/4	8 3/4	1 40	2 50	1 7/8	10 1/2	5 00	13 00
2 3/8	9	1 50	2 75	1 5/4	10 1/2	5 20	13 75
2 1/2	9 1/4	1 60	3 00	1 11/8	10 1/2	5 40	14 65
2 3/4	9 1/2	1 70	3 25	1 5/8	10 1/2	5 60	15 50
2 7/8	9 3/4	1 85	3 50	1 3/2	10 1/2	5 80	16 40
3	9 1/2	2 00	3 75	1 1/2	10 1/2	6 00	17 25
3 1/8	9 3/4	2 15	4 00				

64th sizes furnished at price of next larger size.

Discount.....

Prentice Drills, With ¼-Inch Shanks.
Fitting Boynton & Plummer Drill Press No. 0.
No. 111 A.

Size of Shank ¼ inch diameter and 1 ½ inches long.

Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.
1/8	2 5/8	\$0 25	5/16	4 1/2	\$0 45
3/16	2 11/16	30	3/8	4 1/2	50
1/4	3 1/8	30	7/16	5	55
5/16	3 3/8	35	1/2	5 1/2	60
3/8	3 1/2	35	5/8	5 1/2	60
1/2	3 3/4	40	3/4	5 1/2	70
5/8	4	40	7/8	6	70
3/4	4 1/4	40			

Discount.....

TWIST DRILLS.

**Silver & Deming Drills, $\frac{1}{2}$ -Inch Shanks, Short Lengths Fitting
Blacksmiths' Drill Presses.**



Fig. D. 963.

No. 112.

Size of Shank $\frac{1}{2}$ inch diameter and $2\frac{1}{2}$ inches long.

Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diam., Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
$\frac{1}{8}$	$4\frac{1}{8}$	\$0 45	.....	$\frac{3}{4}$	6	\$1 40	\$3 15
$\frac{3}{8}$	$5\frac{1}{8}$	45	.....	$\frac{7}{8}$	6	1 45	3 30
$\frac{1}{2}$	$5\frac{1}{2}$	50	.....	$\frac{1}{2}$	6	1 50	3 50
$\frac{5}{8}$	$5\frac{3}{8}$	55	.....	$\frac{1}{4}$	6	1 60	3 70
$\frac{3}{4}$	6	60	\$1 10	$\frac{1}{8}$	6	1 70	3 90
$\frac{1}{2}$	6	65	1 20	$\frac{1}{4}$	6	1 80	4 10
$\frac{3}{8}$	6	70	1 30	$\frac{1}{8}$	6	1 90	4 30
$\frac{1}{4}$	6	73	1 40	$\frac{1}{16}$	6	2 00	4 50
$\frac{3}{16}$	6	75	1 45	$\frac{1}{32}$	6	2 10	4 75
$\frac{1}{8}$	6	78	1 55	$\frac{1}{64}$	6	2 20	5 00
$\frac{1}{16}$	6	80	1 60	$\frac{1}{128}$	6	2 25	5 25
$\frac{1}{32}$	6	83	1 70	$\frac{1}{256}$	6	2 30	5 50
$\frac{1}{64}$	6	85	1 75	$\frac{1}{512}$	6	2 35	5 80
$\frac{1}{128}$	6	88	1 90	$\frac{1}{1024}$	6	2 40	6 10
$\frac{1}{256}$	6	90	2 05	$\frac{1}{2048}$	6	2 50	6 40
$\frac{1}{512}$	6	95	2 20	$\frac{1}{4096}$	6	2 60	6 70
$\frac{1}{1024}$	6	1 05	2 30	$\frac{1}{8192}$	6	2 70	7 00
$\frac{1}{2048}$	6	1 10	2 40	$\frac{1}{16384}$	6	2 80	7 40
$\frac{1}{4096}$	6	1 15	2 50	$\frac{1}{32768}$	6	2 90	7 80
$\frac{1}{8192}$	6	1 20	2 65	$\frac{1}{65536}$	6	3 00	8 20
$\frac{1}{16384}$	6	1 25	2 75	$\frac{1}{131072}$	6	3 10	8 60
$\frac{1}{32768}$	6	1 30	2 90	$\frac{1}{262144}$	6	3 20	9 00
$\frac{1}{65536}$	6	1 35	3 00				

64th sizes furnished at price of next larger size.

Discount

THREE FLUTED TAPER SHANK DRILLS.

For enlarging and truing cored, punched or drilled holes.

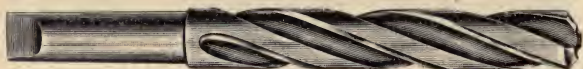


Fig. D. 964.

No. 114 D.

Diameter, Inches.	Length Over All, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Stand- ard Taper Shank.	Diameter, Inches.	Length Over All, Inches.	Price, Each, Carbon Steel.	Price Each, High Speed Steel.	Stand- ard Taper Shank.
$\frac{1}{4}$	6 $\frac{1}{2}$	\$1 50	\$2 00	No. 1	$\frac{1}{4}$	12 $\frac{1}{2}$	\$4 65	\$13 25	No. 4
$\frac{3}{8}$	6 $\frac{1}{2}$	1 60	2 15		$\frac{1}{2}$	12 $\frac{1}{2}$	4 80	14 00	
$\frac{1}{2}$	6 $\frac{1}{2}$	1 60	2 25		$\frac{3}{4}$	14 $\frac{1}{2}$	5 00	14 75	
$\frac{5}{8}$	6 $\frac{1}{2}$	1 70	2 40		$\frac{1}{2}$	14 $\frac{1}{2}$	5 20	15 50	
$\frac{3}{4}$	6 $\frac{1}{2}$	1 70	2 50		$\frac{3}{4}$	14 $\frac{1}{2}$	5 40	16 25	
$\frac{7}{8}$	7	1 75	2 65		$\frac{1}{2}$	14 $\frac{1}{2}$	5 60	17 00	
$\frac{1}{2}$	7 $\frac{1}{2}$	1 80	2 75		$\frac{3}{4}$	14 $\frac{1}{2}$	5 80	17 75	
$\frac{3}{4}$	7 $\frac{1}{2}$	1 85	2 90		$\frac{1}{2}$	14 $\frac{1}{2}$	6 00	18 50	
$\frac{1}{2}$	7 $\frac{1}{2}$	1 90	3 00		$\frac{3}{4}$	14 $\frac{1}{2}$	6 20	19 25	
$\frac{1}{2}$	7 $\frac{1}{2}$				$\frac{1}{2}$	15	6 40	20 00	
$\frac{1}{2}$	8	1 95	3 15	No. 2	$\frac{1}{2}$	15 $\frac{1}{2}$	6 90	21 50	No. 5
$\frac{3}{4}$	8 $\frac{1}{2}$	2 00	3 25		$\frac{3}{4}$	15 $\frac{1}{2}$	7 40	23 00	
$\frac{1}{2}$	8 $\frac{1}{2}$	2 30	3 50		$\frac{1}{2}$	15 $\frac{1}{2}$	7 90	24 50	
$\frac{3}{4}$	8 $\frac{1}{2}$	2 60	3 75		$\frac{3}{4}$	16	8 40	26 50	
$\frac{1}{2}$	9	2 70	4 00		$\frac{1}{2}$	16 $\frac{1}{2}$	8 80	28 50	
$\frac{3}{4}$	9 $\frac{1}{2}$	2 75	4 25		$\frac{3}{4}$	16 $\frac{1}{2}$	9 20	30 50	
$\frac{1}{2}$	9 $\frac{1}{2}$	2 85	4 65		$\frac{1}{2}$	16 $\frac{1}{2}$	9 50	32 50	
$\frac{3}{4}$	9 $\frac{1}{2}$	2 90	5 00		$\frac{3}{4}$	16 $\frac{1}{2}$	9 80	34 50	
$\frac{1}{2}$	9 $\frac{1}{2}$	3 00	5 40		$\frac{1}{2}$	17	10 60	37 50	
$\frac{3}{4}$	10	3 05	5 75		$\frac{3}{4}$	17	11 20	40 50	
$\frac{1}{2}$	10 $\frac{1}{2}$	3 15	6 15	No. 3	$\frac{1}{2}$	17	12 00	43 75	No. 5
$\frac{3}{4}$	10 $\frac{1}{2}$	3 20	6 50		$\frac{3}{4}$	17 $\frac{1}{2}$	12 80	47 50	
$\frac{1}{2}$	10 $\frac{1}{2}$	3 30	7 00		$\frac{1}{2}$	17 $\frac{1}{2}$	13 60	52 50	
$\frac{3}{4}$	10 $\frac{1}{2}$	3 40	7 50		$\frac{3}{4}$	18	14 40	60 00	
$\frac{1}{2}$	10 $\frac{1}{2}$	3 50	8 00		$\frac{1}{2}$	18 $\frac{1}{2}$	15 00	65 00	
$\frac{3}{4}$	11	3 60	8 50		$\frac{3}{4}$	19	15 60	70 00	
$\frac{1}{2}$	11 $\frac{1}{2}$	3 70	9 00		$\frac{1}{2}$	19 $\frac{1}{2}$	16 20	76 25	
$\frac{3}{4}$	11 $\frac{1}{2}$	3 80	9 50		$\frac{3}{4}$	19 $\frac{1}{2}$	16 80	82 50	
$\frac{1}{2}$	11 $\frac{1}{2}$	3 90	10 25		$\frac{1}{2}$	20	17 90	88 75	
$\frac{3}{4}$	11 $\frac{1}{2}$	4 00	11 00		$\frac{3}{4}$	20 $\frac{1}{2}$	19 00	95 00	
$\frac{1}{2}$	11 $\frac{1}{2}$	4 25	11 75	No. 3	$\frac{1}{2}$	20 $\frac{1}{2}$	20 00	102 50	No. 5
$\frac{3}{4}$	12	4 50	12 50		$\frac{3}{4}$	21	21 00	110 00	
					$\frac{1}{2}$	21	23 00	117 50	
					$\frac{3}{4}$	22	25 00	125 00	

Discount

*Discount on carbon steel drills changes here.

32d sizes not listed in high speed are furnished at prices intermediate, and 64th sizes at price of next larger size.

THREE FLUTED STRAIGHT SHANK DRILLS.

For enlarging and truing cored, punched or drilled holes.

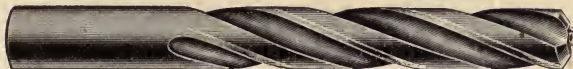


Fig. D. 965.

No. 114 E.

Diameter, Inches.	Length Over all, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diameter, Inches.	Length Over all, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
1/4	6 1/2	\$1 30	\$2 00	1 1/8	14 1/2	\$5 00	\$14 75
1/4	6 1/4	1 40	2 15	1 1/8	14 1/4	5 20	15 50
1/4	6 1/8	1 50	2 25	1 1/8	14 1/8	5 40	16 25
1/4	6 3/8	1 60	2 40	1 1/8	14 3/8	5 60	17 00
1/4	6 7/8	1 70	2 50	1 1/8	14 7/8	5 80	17 75
1/4	7	1 75	2 65	1 1/8	14 3/4	6 00	18 50
1/4	7 1/4	1 80	2 75	1 1/8	14 1/2	6 20	19 25
1/4	7 1/2	1 85	2 90	1 1/2	15	6 40	20 00
1/4	7 3/4	1 90	3 00	*			
1/4	8	1 95	3 15	1 3/8	15 1/4	6 90	21 50
1/4	8 1/4	2 00	3 25	1 3/8	15 1/8	7 40	23 00
1/4	8 1/8	2 30	3 50	1 3/8	15 3/8	7 90	24 50
1/4	8 3/8	2 60	3 75	1 3/4	16	8 40	26 50
1/4	9	2 70	4 00	1 3/8	16 1/4	8 80	28 50
1/4	9 1/4	2 75	4 25	1 3/8	16 3/8	9 20	30 50
1/4	9 1/8	2 85	4 65	1 3/8	16 1/2	9 50	32 50
1/4	9 3/8	2 90	5 00	2	16 3/4	9 80	34 50
1/4	9 7/8	3 00	5 40	2 1/8	17	10 60	37 50
1/4	10	3 05	5 75	2 1/8	17	11 20	40 50
1/4	10 1/4	3 15	6 15	2 1/4	17	12 00	43 75
1/4	10 1/8	3 20	6 50	2 1/4	17 1/2	12 80	47 50
1/4	10 3/8	3 30	7 00	2 1/4	17 1/8	13 60	52 50
1/4	10 7/8	3 40	7 50	2 1/8	18	14 40	60 00
1/4	10 1/2	3 50	8 00	2 1/8	18 1/2	15 00	65 00
1	11	3 60	8 50	2 1/2	19	15 60	70 00
1 1/8	11 1/4	3 70	9 00	2 1/8	19 1/4	16 20	76 25
1 1/8	11 1/8	3 80	9 50	2 1/8	19 3/8	16 80	82 50
1 1/8	11 3/8	3 90	10 25	2 1/4	20	17 90	88 75
1 1/8	11 7/8	4 00	11 00	2 1/4	20 1/2	19 00	95 00
1 1/8	11 1/2	4 25	11 75	2 1/4	20 3/4	20 00	102 50
1 1/4	12	4 50	12 50	2 1/2	21	21 00	110 00
1 1/4	12 1/4	4 65	13 25	2 1/2	21	23 00	117 50
1 1/4	12 3/4	4 80	14 00	3	22	25 00	125 00

*Discount on carbon steel drills changes here.

32d sizes not listed in high speed are furnished at prices intermediate, and 64th sizes at price of next larger size.

Discount.....

SOLID REAMERS.



Fig. D. 966. No. 122.

Diam., Inches.	Length Over All, Inches.	Length of Flute in Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diam., Inches.	Length Over All, Inches.	Length of Flute in Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
$\frac{1}{8}$	3	$1\frac{1}{8}$	\$1 00	\$3 00	$1\frac{1}{8}$	13	$6\frac{1}{2}$	\$7 00	\$25 75
$\frac{1}{4}$	$3\frac{1}{2}$	$1\frac{1}{4}$	1 10	3 25	$1\frac{1}{4}$	13	$6\frac{1}{2}$	7 20	25 75
$\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{3}{8}$	1 20	3 25	$1\frac{3}{8}$	$13\frac{1}{2}$	$6\frac{1}{2}$	7 40	27 50
$\frac{1}{2}$	$3\frac{3}{4}$	$1\frac{3}{8}$	1 30	3 50	$1\frac{1}{2}$	$13\frac{1}{2}$	$6\frac{1}{2}$	7 60	27 50
$\frac{5}{8}$	4	2	1 40	3 50	$1\frac{5}{8}$	$13\frac{1}{2}$	$6\frac{1}{2}$	7 80	29 50
$\frac{3}{4}$	$4\frac{1}{4}$	$2\frac{1}{8}$	1 45	3 75	$1\frac{3}{4}$	$13\frac{1}{2}$	$6\frac{1}{2}$	8 00	29 50
$\frac{7}{8}$	$4\frac{1}{4}$	$2\frac{1}{8}$	1 50	3 75	$1\frac{7}{8}$	$13\frac{1}{2}$	$6\frac{1}{2}$	8 20	31 50
1	$4\frac{1}{4}$	$2\frac{1}{8}$	1 55	4 25	$1\frac{1}{8}$	$13\frac{1}{2}$	$6\frac{1}{2}$	8 40	31 50
$1\frac{1}{8}$	5	2	1 60	4 25	$1\frac{1}{4}$	$13\frac{1}{2}$	$6\frac{1}{2}$	8 60	33 50
$1\frac{1}{4}$	$5\frac{1}{4}$	$2\frac{1}{4}$	1 70	4 75	$1\frac{1}{2}$	14	7	8 80	33 50
$1\frac{1}{2}$	$5\frac{1}{4}$	$2\frac{1}{4}$	1 75	4 75	$1\frac{3}{4}$	14	7	9 00	35 75
$1\frac{3}{4}$	5	2	1 85	5 25	$1\frac{7}{8}$	14	7	9 20	35 75
$1\frac{7}{8}$	$5\frac{1}{2}$	3	1 90	5 25	2	14	7	9 40	38 00
2	6	$3\frac{1}{8}$	1 95	5 75	2	14	7	9 60	38 00
$2\frac{1}{8}$	$6\frac{1}{4}$	$3\frac{1}{8}$	2 00	5 75	2	$14\frac{1}{2}$	$7\frac{1}{2}$	9 80	40 75
$2\frac{1}{4}$	$6\frac{1}{4}$	$3\frac{1}{4}$	2 10	6 25	2	$14\frac{1}{2}$	$7\frac{1}{2}$	10 00	40 75
$2\frac{3}{8}$	7	$3\frac{3}{4}$	2 20	6 25	2	$14\frac{1}{2}$	$7\frac{1}{2}$	10 20	43 50
$2\frac{1}{2}$	$7\frac{1}{4}$	$3\frac{3}{4}$	2 30	6 75	2	$14\frac{1}{2}$	$7\frac{1}{2}$	10 40	43 50
$2\frac{5}{8}$	$7\frac{1}{4}$	$3\frac{3}{4}$	2 40	6 75	2	15	$7\frac{1}{2}$	10 60	46 25
$2\frac{3}{4}$	$8\frac{1}{8}$	4	2 50	7 25	2	15	$7\frac{1}{2}$	10 80	46 25
$2\frac{7}{8}$	$8\frac{1}{8}$	4	2 60	7 25	2	15	$7\frac{1}{2}$	11 05	49 00
3	$8\frac{1}{4}$	4	2 70	7 75	2	15	$7\frac{1}{2}$	11 30	49 00
$3\frac{1}{8}$	9	4	2 80	7 75	2	15	$7\frac{1}{2}$	11 55	51 75
$3\frac{1}{4}$	$9\frac{1}{8}$	4	2 95	8 50	2	15	$7\frac{1}{2}$	11 80	51 75
$3\frac{3}{8}$	$9\frac{1}{8}$	4	3 10	8 50	2	15	$7\frac{1}{2}$	12 05	55 00
$3\frac{1}{2}$	10	5	3 25	9 50	2	15	$7\frac{1}{2}$	12 30	55 00
$3\frac{5}{8}$	$10\frac{1}{4}$	5	3 40	9 50	2	$15\frac{1}{2}$	$7\frac{1}{2}$	12 55	58 25
$3\frac{3}{4}$	$10\frac{1}{4}$	5	3 55	10 50	2	$15\frac{1}{2}$	$7\frac{1}{2}$	12 80	58 25
4	10	5	3 70	10 50	2	$15\frac{1}{2}$	$7\frac{1}{2}$	13 10	61 50
$4\frac{1}{8}$	11	5	3 85	11 50	2	$15\frac{1}{2}$	$7\frac{1}{2}$	13 40	61 50
$4\frac{1}{4}$	$11\frac{1}{4}$	5	4 00	11 50	2	$15\frac{1}{2}$	$7\frac{1}{2}$	13 70	64 75
$4\frac{3}{8}$	11	5	4 15	12 75	2	$15\frac{1}{2}$	$7\frac{1}{2}$	14 00	64 75
$4\frac{1}{2}$	$11\frac{1}{8}$	5	4 30	12 75	2	16	8	14 30	68 00
$4\frac{5}{8}$	$11\frac{1}{8}$	5	4 45	14 25	2	16	8	14 60	68 00
$4\frac{3}{4}$	12	6	4 60	14 25	2	16	8	15 00	71 25
5	$12\frac{1}{4}$	$6\frac{1}{8}$	4 75	15 75	2	16	8	15 40	71 25
$5\frac{1}{8}$	$12\frac{1}{4}$	$6\frac{1}{8}$	4 90	15 75	2	16	8	15 80	74 50
$5\frac{1}{4}$	$12\frac{1}{2}$	$6\frac{1}{4}$	5 05	17 25	2	16	8	16 20	74 50
$5\frac{3}{8}$	$12\frac{1}{2}$	$6\frac{1}{4}$	5 20	17 25	2	$16\frac{1}{2}$	$8\frac{1}{4}$	16 60	77 75
$5\frac{1}{2}$	$12\frac{1}{2}$	$6\frac{1}{4}$	5 40	18 75	2	$16\frac{1}{2}$	$8\frac{1}{4}$	17 00	77 75
$5\frac{5}{8}$	$12\frac{3}{8}$	$6\frac{3}{4}$	5 60	18 75	2	$16\frac{1}{2}$	$8\frac{1}{4}$	17 40	81 00
$5\frac{3}{4}$	$12\frac{3}{8}$	$6\frac{3}{4}$	5 80	20 50	2	$16\frac{1}{2}$	$8\frac{1}{4}$	17 80	81 00
6	$12\frac{3}{4}$	$6\frac{3}{4}$	6 00	20 50	2	$16\frac{1}{2}$	$8\frac{1}{4}$	18 20	84 25
$6\frac{1}{8}$	$12\frac{3}{4}$	$6\frac{3}{4}$	6 20	22 25	2	$16\frac{1}{2}$	$8\frac{1}{4}$	18 60	84 25
$6\frac{1}{4}$	13	$6\frac{1}{2}$	6 40	22 25	2	$16\frac{1}{2}$	$8\frac{1}{4}$	19 00	87 50
$6\frac{3}{8}$	13	$6\frac{1}{2}$	6 60	24 00	3	$16\frac{1}{2}$	$8\frac{1}{4}$	19 40	87 50
$6\frac{1}{2}$	13	$6\frac{1}{2}$	6 80	24 00					

64th sizes furnished at price of next larger size. Reamers are made with eccentric flutes and are slightly tapered on end to facilitate entering work.

Discount.....

Self Feeding Reamers No. 122 A Same List.

STANDARD JOBBERS' REAMERS

With Taper Shanks.



Fig. D. 967.

No. 122 B.

Diam., Inches.	Length Over All, Inches.	Length of Flute in Inches.	Carbon Steel, Price each.	High Speed Steel, Price each.	Socket for Morse Taper.	Diam., Inches.	Length Over All, Inches.	Length of Flute in Inches.	Carbon Steel, Price each.	High Speed Steel, Price each.	Socket for Morse Taper.
$\frac{1}{4}$	$\frac{5}{8}$	2	\$1 50	\$4 00	No. 1, \$1 20	$\frac{1}{4}$	11	$\frac{6}{16}$	\$5 00	\$16 75	No. 4, \$4 00
$\frac{3}{8}$	$\frac{7}{8}$	2	1 55	4 25		$\frac{3}{8}$	11	$\frac{6}{16}$	5 15	18 25	
$\frac{1}{2}$	$1\frac{1}{8}$	2	1 60	4 25		$\frac{1}{2}$	12	$\frac{6}{16}$	5 30	18 25	
$\frac{5}{8}$	$1\frac{1}{4}$	2	1 65	4 75		$\frac{5}{8}$	12	$\frac{6}{16}$	5 50	19 75	
$\frac{3}{4}$	$1\frac{3}{8}$	2	1 70	4 75		$\frac{3}{4}$	12	$\frac{6}{16}$	6 50	19 75	
$\frac{7}{8}$	$1\frac{5}{8}$	2	1 80	5 25		$\frac{7}{8}$	12	$\frac{6}{16}$	5 90	21 50	
1	$1\frac{7}{8}$	2	1 85	5 25		1	13	$\frac{6}{16}$	6 10	21 50	
$1\frac{1}{8}$	2	2	1 95	5 75		$1\frac{1}{8}$	13	$\frac{6}{16}$	6 50	23 25	
$1\frac{1}{4}$	$2\frac{1}{8}$	3	2 00	5 75		$1\frac{1}{4}$	13	$\frac{6}{16}$	6 90	25 00	
$1\frac{3}{8}$	$2\frac{1}{4}$	3	2 10	6 25		$1\frac{3}{8}$	14	$\frac{6}{16}$	7 30	26 75	
$1\frac{1}{2}$	$2\frac{3}{8}$	3	2 15	6 25		$1\frac{1}{2}$	14	$\frac{6}{16}$	7 70	28 50	
$1\frac{5}{8}$	$2\frac{5}{8}$	3	2 25	6 75	No. 2, \$1 80	$1\frac{5}{8}$	14	$\frac{6}{16}$	8 00	30 50	No. 5, \$7 50
$1\frac{3}{4}$	$2\frac{7}{8}$	3	2 30	6 75		$1\frac{3}{4}$	15	$\frac{6}{16}$	8 40	32 50	
$1\frac{7}{8}$	3	3	2 40	7 25		$1\frac{7}{8}$	15	$\frac{6}{16}$	8 80	34 50	
2	$3\frac{1}{8}$	3	2 50	7 25		2	15	$\frac{6}{16}$	9 20	36 75	
$2\frac{1}{8}$	$3\frac{1}{4}$	4	2 60	7 75		$2\frac{1}{8}$	15	$\frac{6}{16}$	9 60	39 00	
$2\frac{1}{4}$	$3\frac{3}{8}$	4	2 70	7 75		$2\frac{1}{4}$	15	$\frac{6}{16}$	10 00	41 75	
$2\frac{3}{8}$	$3\frac{1}{2}$	4	2 80	8 50		$2\frac{3}{8}$	15	$\frac{6}{16}$	10 40	44 50	
$2\frac{1}{2}$	$3\frac{5}{8}$	4	2 90	8 50		$2\frac{1}{2}$	15	$\frac{6}{16}$	10 80	47 25	
$2\frac{5}{8}$	$3\frac{3}{4}$	4	3 05	9 50		$2\frac{5}{8}$	16	$\frac{6}{16}$	11 30	50 00	
$2\frac{3}{4}$	$3\frac{7}{8}$	4	3 20	9 50		$2\frac{3}{4}$	16	$\frac{6}{16}$	11 80	53 25	
$2\frac{7}{8}$	4	4	3 35	10 50		$2\frac{7}{8}$	16	$\frac{6}{16}$	12 30	56 50	
3	$4\frac{1}{8}$	5	3 50	10 50	No. 3, \$2 50	3	16	$\frac{6}{16}$	12 80	59 75	
$3\frac{1}{8}$	$4\frac{1}{4}$	5	3 65	11 50		$3\frac{1}{8}$	16	$\frac{6}{16}$	13 40	63 00	
$3\frac{1}{4}$	$4\frac{3}{8}$	5	3 80	11 50		$3\frac{1}{4}$	16	$\frac{6}{16}$	14 00	66 25	
$3\frac{3}{8}$	$4\frac{1}{2}$	5	3 95	12 50		$3\frac{3}{8}$	16	$\frac{6}{16}$	14 60	69 50	
$3\frac{1}{2}$	$4\frac{5}{8}$	5	4 10	12 50		$3\frac{1}{2}$	17	$\frac{6}{16}$	15 40	72 75	
$3\frac{5}{8}$	$4\frac{3}{4}$	5	4 25	13 75		$3\frac{5}{8}$	17	$\frac{6}{16}$	16 20	76 00	
$3\frac{3}{4}$	$4\frac{7}{8}$	5	4 40	13 75		$3\frac{3}{4}$	17	$\frac{6}{16}$	17 00	79 25	
$3\frac{7}{8}$	5	5	4 55	15 25		$3\frac{7}{8}$	17	$\frac{6}{16}$	17 80	82 50	
4	$5\frac{1}{8}$	6	4 70	15 25		4	17	$\frac{6}{16}$	18 60	86 25	
$4\frac{1}{8}$	$5\frac{1}{4}$	6	4 85	16 75		$4\frac{1}{8}$	17	$\frac{6}{16}$	19 40	90 00	

32d sizes not listed furnished at prices intermediate, and 64th sizes at price of next larger size. Reamers are made with eccentric flutes slightly tapered on end to facilitate entering work.

Discount.....

STANDARD SHELL REAMERS.



Fig. D. 968. Fluted Shell, No. 123.



Fig. D. 969. Rose Shell, No. 123 1/2.

Diameter, Inches.	Length Over All, Inches.	Size of Hole, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Diameter, Inches.	Length Over All, Inches.	Size of Hole, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.
1 1/2	2	1 1/4	\$1 40	\$3 25	3 1/8	4 1/2	1 1/2	\$ 9 90	\$ 31 50
1 1/2	2	1 1/4	1 50	3 40	3 1/8	4 1/2	1 1/2	10 20	33 25
1 5/8	2 1/4	1 1/4	1 60	3 55	3 1/8	4 1/2	1 1/2	10 60	35 25
1 5/8	2 1/4	1 1/4	1 60	3 70	3 1/4	4 1/2	1 1/4	11 00	37 50
1 3/4	2 1/2	1 1/4	1 60	3 85	3 1/4	4 1/2	1 1/4	11 50	40 00
1 3/4	2 1/2	1 1/4	1 60	4 00	3 3/8	4 1/2	1 1/4	12 00	42 50
1 3/4	2 1/2	1 1/4	1 70	4 25	3 3/8	4 1/2	1 1/4	12 50	45 25
1 3/4	2 1/2	1 1/4	1 70	4 50	3 1/2	4 1/2	1 1/4	13 00	48 00
1 3/4	2 1/2	1 1/4	1 80	4 75	3 1/2	5	2	13 50	50 75
1 1/2	2 1/2	1 1/4	1 80	5 00	3 5/8	5	2	14 00	53 50
1 1/2	2 1/2	1 1/4	1 90	5 25	3 1/2	5	2	14 50	56 50
1 1/2	2 1/2	1 1/4	2 00	5 50	3 3/4	5	2	15 00	59 50
1 1/2	2 1/2	1 1/4	2 20	5 75	3 3/4	5	2	15 50	62 75
1 1/2	3	1 1/4	2 40	6 00	3 7/8	5	2	16 00	66 00
1 1/2	3	1 1/4	2 60	6 50	3 1/2	5	2	17 00	69 25
1 1/2	3	1 1/4	2 80	7 00	4	5	2	18 00	72 50
1 1/2	3	1 1/4	3 00	7 50	4 1/8	5 1/2	2 1/4	18 30	75 75
1 1/2	3	1 1/4	3 20	8 25	4 1/8	5 1/2	2 1/4	18 60	79 00
1 1/2	3	1 1/4	3 50	9 00	4 1/8	5 1/2	2 1/4	19 00	82 25
1 1/2	3 1/4	1	3 80	9 75	4 1/4	5 1/2	2 1/4	19 40	85 50
1 1/2	3 1/4	1	4 10	10 50	4 1/4	5 1/2	2 1/4	19 80	88 75
1 1/2	3 1/4	1	4 40	11 25	4 3/8	5 1/2	2 1/4	20 20	92 00
1 1/2	3 1/4	1	4 70	12 00	4 7/8	5 1/2	2 1/4	20 60	95 25
1 1/2	3 1/4	1	5 00	12 75	4 1/2	5 1/2	2 1/4	21 00	98 50
1 1/2	3 1/4	1	5 20	13 50	4 1/2	5 1/2	2 1/4	21 60	101 75
1 1/2	3 1/4	1 1/4	5 40	14 25	4 5/8	6	2 1/2	22 20	105 00
1 1/2	3 1/4	1 1/4	5 60	15 00	4 1/8	6	2 1/2	22 80	108 25
1 1/2	3 1/4	1 1/4	5 80	15 75	4 3/4	6	2 1/2	23 40	111 50
1 1/2	3 1/4	1 1/4	6 00	16 50	4 1/2	6	2 1/2	24 00	114 75
1 1/2	3 1/4	1 1/4	6 20	17 25	4 7/8	6	2 1/2	24 60	118 00
1 1/2	3 1/4	1 1/4	6 40	18 00	4 1/8	6	2 1/2	25 20	121 25
1 1/2	3 1/4	1 1/4	6 60	18 75	5	6	2 1/2	26 00	125 00
1 1/2	3 1/4	1 1/4	6 80	19 50	5 1/8	6	2 1/2	28 00	132 50
1 1/2	4	1 1/2	7 00	20 50	5 1/4	6	2 1/2	30 00	140 00
1 1/2	4	1 1/2	7 30	21 75	5 3/8	6	2 1/2	32 00	147 50
1 1/2	4	1 1/2	7 60	23 00	5 1/2	6	2 1/2	34 00	155 00
1 1/2	4	1 1/2	8 00	24 25	5 5/8	6 1/2	2 3/4	36 50	163 75
1 1/2	4	1 1/2	8 40	25 50	5 3/4	6 1/2	2 3/4	39 00	172 50
1 1/2	4	1 1/2	8 80	27 00	5 7/8	6 1/2	2 3/4	42 00	181 25
1 1/2	4	1 1/2	9 20	28 50	6	6 1/2	2 3/4	45 00	190 00
3	4	1 1/2	9 60	30 00					

32d sizes not listed furnished at prices intermediate, and 64th sizes at price of next larger size.

Reamers fitting No. 15 arbor are 6 1/4 inches long, and have 2 1/4-inch hole.

" " " " 7 " " " 3 " "

Discount.....

“STANAR” ADJUSTABLE HAND REAMER.

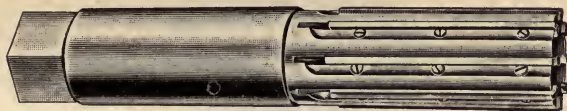


Fig. D. 970.

Patented April 19th, 1910.

No. 123 C Carbon Steel.

No. 660 High Speed Steel.

Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price, Each.		Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price, Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
1/16	6	2	\$ 5 20	\$ 7 50	1 1/8	10 1/2	4 1/2	\$11 80	\$18 40
1/8	6	2	5 20	7 75	1 1/4	10	4 1/2	12 00	18 75
3/16	6	2	5 20	8 00	1 1/2	11	4 1/2	12 20	19 10
1/4	6	2	5 35	8 25	1 3/4	11	4 1/2	12 45	19 45
5/16	7	2	5 50	8 50	2	11 1/2	4 1/2	12 65	19 80
3/8	7	2	5 65	8 75	2 1/8	11	4 1/2	12 90	20 15
7/16	7	2	5 80	9 00	2 1/4	11	4 1/2	13 25	20 50
1/2	7	2	5 95	9 25	2 3/8	11	4 1/2	13 50	20 85
5/8	7	3	6 10	9 50	2 1/2	11	4 1/2	13 75	21 20
3/4	7	3	6 25	9 75	2 5/8	11	4 1/2	14 00	21 55
7/8	7	3	6 40	10 00	2 3/4	11	4 1/2	14 25	21 90
1	7	3	6 55	10 25	2 7/8	12	4 1/2	14 55	22 25
1 1/16	8	3	6 70	10 50	2 3/4	12 1/2	4 1/2	14 80	22 60
1 1/8	8	3	6 85	10 75	2 5/8	12 1/2	4 1/2	15 05	22 95
1 1/4	8	3	7 00	11 00	2 3/4	12 1/2	4 1/2	15 30	23 30
1 1/2	8	3	7 20	11 25	2 5/8	12 1/2	4 1/2	15 60	23 65
1 3/8	8	3	7 40	11 50	2 3/4	12 1/2	4 1/2	15 85	24 00
1 1/2	8	3	7 60	11 75	2 5/8	12 1/2	4 1/2	16 15	24 35
1 5/8	8	3	7 80	12 00	2 3/4	12 1/2	5	16 40	24 70
1 3/4	8	3	8 00	12 25	2 5/8	12 1/2	5	16 65	25 05
1 7/8	8	3	8 20	12 50	2 3/4	13	5	16 90	25 40
2	8	3	8 40	12 75	2 5/8	13 1/2	5	17 20	25 75
2 1/16	9	3	8 60	13 00	2 3/4	13	5	17 45	26 20
2 1/8	9	3	8 80	13 25	2 5/8	13	5	17 70	26 65
2 1/4	9	3	9 00	13 50	2 3/4	13 1/2	5	17 95	27 10
2 1/2	9	3	9 20	13 85	2 5/8	13 1/2	5	18 25	27 55
2 3/8	9	3	9 40	14 20	2 3/4	13 1/2	5 1/2	18 50	28 00
2 1/2	9	3	9 60	14 55	2 5/8	13 1/2	5 1/2	18 75	28 45
2 5/8	9	3	9 80	14 90	2 3/4	13 1/2	5 1/2	19 00	28 90
2 3/4	9	3	10 00	15 25	2 5/8	14	5 1/2	19 30	29 35
2 7/8	9	3	10 20	15 60	2 3/4	14 1/2	5 1/2	19 55	29 80
3	10	3	10 40	15 95	2 5/8	14 1/2	5 1/2	19 85	30 25
3 1/16	10 1/2	4	10 60	16 30	2 3/4	14 3/4	5 1/2	20 10	30 75
3 1/8	10 1/2	4	10 80	16 65	2 5/8	14 3/4	5 1/2	20 35	31 25
3 1/4	10 1/2	4	11 00	17 00	2 3/4	14 3/4	5 1/2	20 60	31 75
3 1/2	10 1/2	4	11 20	17 35	2 5/8	14 3/4	5 1/2	20 90	32 25
3 3/8	10 1/2	4 1/2	11 40	17 70	2 3/4	14 3/4	5 1/2	21 15	32 75
3 1/2	10 1/2	4 1/2	11 60	18 05	2 5/8	14 3/4	5 1/2		

Discount

“STANAR” ADJUSTABLE SHELL REAMER.



Fig. D. 971.

Patented April 19th, 1910.

No. 123 D Carbon Steel.

No. 661 High Speed Steel.

Diam., Inches.	Length Over All, Inches.	Hole, Inches.	Length of Blades, Inches.	Price, Each.		Diam., Inches.	Length Over All, Inches.	Hole, Inches.	Length of Blades, Inches.	Price, Each.	
				Carb'n Steel.	High Speed Steel.					Carb'n Steel.	High Speed Steel.
1	1		1	\$ 5 10	\$ 7 50	3	4	1	3	\$19 00	\$29 00
1	1		1	5 10	7 75	3	4	1	3	19 50	29 75
1	1		1	5 20	8 00	3	4	1	3	20 00	30 50
1	1		1	5 35	8 25	3	4	1	3	20 50	31 25
1	1		1	5 50	8 50	3	4	1	3	21 00	32 00
1	1		1	5 90	9 00	3	4	1	3	21 50	32 75
1	1		1	6 35	9 50	3	4	1	3	22 00	33 50
1	1		1	6 90	10 00	4	5	2	3	22 50	34 25
1	1		1	7 40	10 50	4	5	2	3	23 00	35 00
1	1		1	7 60	11 00	4	5	2	3	23 50	35 75
1	1		2	7 80	11 50	4	5	2	3	24 00	36 50
1	1		2	8 00	12 00	4	5	2	3	24 50	37 25
1	1		2	8 15	12 50	4	5	2	3	25 00	38 00
1	1		2	8 35	13 00	4	5	2	3	25 50	38 75
1	1		2	8 50	13 50	4	5	2	3	26 00	39 50
1	1		2	8 70	14 00	4	5	2	4	26 50	40 25
2	3		2	8 85	14 50	4	5	2	4	27 00	41 00
2	3		2	9 00	15 00	4	5	2	4	27 50	41 75
2	3		2	9 25	15 50	4	5	2	4	28 00	42 50
2	3		2	9 50	16 00	4	5	2	4	28 50	43 25
2	3		2	9 70	16 50	4	5	2	4	29 00	44 00
2	3		2	10 00	17 00	4	6	2	4	29 50	44 75
2	3		2	10 25	17 50	4	6	2	4	30 00	45 50
2	3		2	10 50	18 00	5	6	2	4	30 50	46 25
2	3		2	10 75	18 50	5	6	2	4	30 80	47 00
2	3		2	11 00	19 00	5	6	2	4	31 20	47 75
2	3		2	11 50	19 50	5	6	2	4	31 60	48 50
2	3		2	12 00	20 00	5	6	2	4	32 00	49 25
2	3		2	12 50	20 50	5	6	2	4	32 50	50 00
2	3		2	13 00	21 00	5	6	2	4	33 00	50 75
2	3		2	13 50	21 50	5	6	2	4	33 50	51 50
2	3		2	14 00	22 00	5	6	2	4	34 00	52 25
3	3		2	14 50	22 50	5	6	2	4	34 50	53 00
3	3		2	15 00	23 00	5	6	2	4	35 00	53 75
3	3		2	15 50	23 75	5	6	2	4	35 50	54 50
3	3		3	16 00	24 50	5	6	2	4	36 00	55 25
3	3		3	16 50	25 25	5	6	2	4	36 50	56 00
3	3		3	17 00	26 00	5	6	2	4	37 00	56 75
3	3		3	17 50	26 75	5	6	2	4	37 50	57 50
3	3		3	18 00	27 50	6	6	2	4	38 00	58 25
3	3		3	18 50	28 25						

Discount

“STANAR” ADJUSTABLE CHUCKING REAMER.



Fig. D. 972.

Patented April 19th, 1910.

No. 123 E Carbon Steel.

No. 662 High Speed Steel.

Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price Each.		Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
$1\frac{1}{8}$	9	$1\frac{3}{4}$	\$ 4 00	\$ 6 00	$1\frac{7}{8}$	14	$2\frac{1}{2}$	\$ 9 60	\$15 60
$1\frac{1}{4}$	9	$1\frac{3}{4}$	4 00	6 20	$1\frac{3}{4}$	14	$2\frac{1}{2}$	9 75	15 90
$1\frac{1}{2}$	$9\frac{1}{2}$	$1\frac{3}{4}$	4 00	6 40	$1\frac{3}{4}$	14	$2\frac{1}{2}$	9 90	16 20
$1\frac{3}{4}$	9	$1\frac{3}{4}$	4 15	6 60	$1\frac{3}{4}$	14	$2\frac{1}{2}$	10 05	16 50
$1\frac{7}{8}$	$9\frac{1}{2}$	$1\frac{3}{4}$	4 25	6 80	2	14	$2\frac{1}{2}$	10 25	16 80
$1\frac{7}{8}$	9	$1\frac{3}{4}$	4 40	7 00	$2\frac{1}{8}$	14	$2\frac{1}{2}$	10 45	17 10
$1\frac{7}{8}$	10	$1\frac{3}{4}$	4 50	7 20	$2\frac{1}{8}$	$14\frac{1}{2}$	$2\frac{1}{2}$	10 65	17 40
$1\frac{7}{8}$	10	$1\frac{3}{4}$	4 65	7 40	$2\frac{1}{8}$	14	$2\frac{1}{2}$	10 85	17 70
$1\frac{7}{8}$	10	$1\frac{3}{4}$	4 75	7 60	$2\frac{1}{8}$	$14\frac{1}{2}$	$2\frac{1}{2}$	11 05	18 00
$1\frac{7}{8}$	10	$1\frac{3}{4}$	4 90	7 80	$2\frac{1}{8}$	14	$2\frac{1}{2}$	11 25	18 35
1	10	$1\frac{3}{4}$	5 00	8 00	$2\frac{1}{8}$	$14\frac{1}{2}$	$2\frac{1}{2}$	11 45	18 70
$1\frac{1}{8}$	$10\frac{1}{2}$	$1\frac{3}{4}$	5 15	8 25	$2\frac{1}{8}$	14	$2\frac{1}{2}$	11 70	19 05
$1\frac{1}{4}$	10	$1\frac{3}{4}$	5 25	8 50	$2\frac{1}{8}$	$14\frac{1}{2}$	$2\frac{1}{2}$	11 90	19 40
$1\frac{1}{2}$	10	$1\frac{3}{4}$	5 40	8 75	$2\frac{1}{8}$	14	$2\frac{1}{2}$	12 05	19 75
$1\frac{3}{4}$	11	2	5 50	9 00	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 20	20 10
$1\frac{7}{8}$	11	2	5 60	9 25	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 35	20 45
$1\frac{7}{8}$	11	2	5 75	9 50	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 50	20 80
$1\frac{7}{8}$	11	2	5 90	9 75	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 65	21 15
$1\frac{7}{8}$	11	2	6 00	10 00	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 80	21 50
$1\frac{7}{8}$	11	2	6 25	10 25	$2\frac{1}{8}$	15	$2\frac{1}{2}$	12 95	21 85
$1\frac{7}{8}$	11	2	6 50	10 50	$2\frac{1}{8}$	15	$2\frac{1}{2}$	13 10	22 20
$1\frac{7}{8}$	11	2	6 75	10 75	$2\frac{1}{8}$	15	$2\frac{1}{2}$	13 35	22 65
$1\frac{7}{8}$	12	2	7 00	11 00	$2\frac{1}{8}$	$15\frac{1}{2}$	$2\frac{1}{2}$	13 60	23 10
$1\frac{7}{8}$	12	2	7 25	11 25	$2\frac{1}{8}$	15	$2\frac{1}{2}$	13 90	23 55
$1\frac{7}{8}$	12	2	7 50	11 50	$2\frac{1}{8}$	$15\frac{1}{2}$	$2\frac{1}{2}$	14 20	24 00
$1\frac{7}{8}$	12	2	7 75	11 75	$2\frac{1}{8}$	15	$2\frac{1}{2}$	14 55	24 45
$1\frac{7}{8}$	12	2	8 00	12 00	$2\frac{1}{8}$	$15\frac{1}{2}$	3	14 90	24 90
$1\frac{7}{8}$	12	2	8 15	12 30	$2\frac{1}{8}$	15	3	15 30	25 35
$1\frac{7}{8}$	12	2	8 25	12 60	$2\frac{1}{8}$	$15\frac{1}{2}$	3	15 65	25 80
$1\frac{7}{8}$	12	2	8 40	12 90	$2\frac{1}{8}$	15	3	16 05	26 25
$1\frac{7}{8}$	13	$2\frac{1}{4}$	8 50	13 20	$2\frac{1}{8}$	16	3	16 45	26 70
$1\frac{7}{8}$	13	$2\frac{1}{4}$	8 65	13 50	$2\frac{1}{8}$	16	3	16 90	27 15
$1\frac{7}{8}$	13	$2\frac{1}{4}$	8 75	13 80	$2\frac{1}{8}$	16	3	17 30	27 60
$1\frac{7}{8}$	13	$2\frac{1}{4}$	8 90	14 10	$2\frac{1}{8}$	16	3	17 75	28 05
$1\frac{7}{8}$	13	$2\frac{1}{4}$	9 00	14 40	$2\frac{1}{8}$	16	3	18 20	28 50
$1\frac{7}{8}$	13	$2\frac{1}{4}$	9 15	14 70	$2\frac{1}{8}$	16	3	18 65	29 00
$1\frac{7}{8}$	13	$2\frac{1}{4}$	9 30	15 00	3	16	3	19 10	29 50
$1\frac{7}{8}$	13	$2\frac{1}{4}$	9 45	15 30					

Discount.....

"STANAR" ADJUSTABLE CHUCKING REAMER.
With Standard Taper Shank.



Fig. D. 973.

Patented April 19th, 1910.

No. 123 F Carbon Steel.

No. 663 High Speed Steel.

Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price Each.		Diameter, Inches.	Length Over All, Inches.	Length of Blades, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
1 1/16	9	1 1/16	\$ 4 00	\$ 7 00	1 7/8	14	2 1/4	\$ 9 60	\$17 95
1 1/8	9	1 1/8	4 00	7 20	1 7/8	14	2 1/4	9 75	18 30
1 1/4	9 1/2	1 1/4	4 00	7 40	1 7/8	14	2 1/4	9 90	18 65
1 1/2	9 1/2	1 1/2	4 15	7 60	1 7/8	14	2 1/4	10 05	19 00
1 3/4	9 1/2	1 3/4	4 25	7 80	2	14	2 1/2	10 25	19 35
2	9 1/2	2	4 40	8 00	2	14	2 1/2	10 45	19 70
2 1/8	10	2 1/8	4 50	8 25	2 1/8	14 1/2	2 1/2	10 65	20 05
2 1/4	10	2 1/4	4 65	8 50	2 1/4	14 1/2	2 1/2	10 85	20 40
2 1/2	10	2 1/2	4 75	8 75	2 1/2	14 1/2	2 1/2	11 05	20 75
2 3/4	10	2 3/4	4 90	9 00	2 3/4	14 1/2	2 1/2	11 25	21 10
3	10 1/2	3	5 00	9 25	2 3/4	14 1/2	2 1/2	11 45	21 55
3 1/8	10 1/2	3 1/8	5 15	9 50	2 3/4	14 1/2	2 1/2	11 70	22 00
3 1/4	10 1/2	3 1/4	5 25	9 75	2 3/4	14 1/2	2 1/2	11 90	22 45
3 1/2	10 1/2	3 1/2	5 40	10 00	2 3/4	14 1/2	2 1/2	12 05	22 90
3 3/4	11	3 3/4	5 50	10 30	2 3/4	15	2 1/2	12 20	23 35
4	11	4	5 60	10 60	2 3/4	15	2 1/2	12 35	23 80
4 1/8	11	4 1/8	5 75	10 90	2 3/4	15	2 1/2	12 50	24 25
4 1/4	11	4 1/4	5 90	11 20	2 3/4	15	2 1/2	12 65	24 70
4 1/2	11 1/2	4 1/2	6 00	11 50	2 3/4	15	2 1/2	12 80	25 15
4 3/4	11 1/2	4 3/4	6 25	11 80	2 3/4	15	2 1/2	12 95	25 60
5	11 1/2	5	6 50	12 10	2 3/4	15	2 1/2	13 10	26 05
5 1/8	11 1/2	5 1/8	6 75	12 40	2 3/4	15	2 1/2	13 35	26 50
5 1/4	12	5 1/4	7 00	12 70	2 3/4	15 1/2	2 1/2	13 60	26 95
5 1/2	12	5 1/2	7 25	13 00	2 3/4	15 1/2	2 1/2	13 90	27 40
5 3/4	12	5 3/4	7 50	13 30	2 3/4	15 1/2	2 1/2	14 20	27 85
6	12	6	7 75	13 60	2 3/4	15 1/2	2 1/2	14 55	28 30
6 1/8	12 1/2	6 1/8	8 00	13 90	2 3/4	15 1/2	3	14 90	28 75
6 1/4	12 1/2	6 1/4	8 15	14 20	2 3/4	15 1/2	3	15 30	29 25
6 1/2	12 1/2	6 1/2	8 25	14 50	2 3/4	15 1/2	3	15 65	29 75
6 3/4	12 1/2	6 3/4	8 40	14 80	2 3/4	15 1/2	3	16 05	30 25
7	13	7	8 50	15 15	2 3/4	16	3	16 45	30 75
7 1/8	13	7 1/8	8 65	15 50	2 3/4	16	3	16 90	31 25
7 1/4	13	7 1/4	8 75	15 85	2 3/4	16	3	17 30	31 75
7 1/2	13	7 1/2	8 90	16 20	2 3/4	16	3	17 75	32 25
7 3/4	13 1/2	7 3/4	9 00	16 55	2 3/4	16	3	18 20	32 75
8	13 1/2	8	9 15	16 90	2 3/4	16	3	18 65	33 25
8 1/8	13 1/2	8 1/8	9 30	17 25	3	16	3	19 10	33 75
8 1/4	13 1/2	8 1/4	9 45	17 60					

Discount

ARBORS.
Straight Shank.

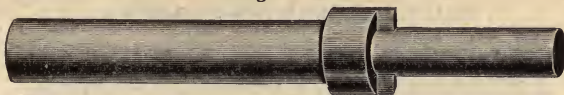


Fig. D. 974. No. 129-S.
For "Stanar" Adjustable Shell Reamers.

Taper Shank.



Fig. D. 975. No. 129-T.
For "Stanar" Adjustable Shell Reamers.

Price List No. 129-S. (Straight Shank.)				Price List No. 129-T. (Taper Shank.)				
No.	Price, Each.	Fitting, Sizes.	Length Over All, Inches.	No.	Price, Each.	Fitting, Sizes.	Length Over All, Inches.	Standard Taper Shank.
4	\$1 80	1 to 1 $\frac{3}{8}$	9	4	\$2 80	1 to 1 $\frac{3}{8}$	9	No. 2
5	2 00	1 $\frac{1}{4}$ " 1 $\frac{1}{2}$	9 $\frac{1}{2}$	5	3 00	1 $\frac{1}{4}$ " 1 $\frac{1}{2}$	9 $\frac{1}{2}$	" 2
6	2 20	1 $\frac{5}{8}$ " 1 $\frac{1}{2}$	10	6	3 20	1 $\frac{5}{8}$ " 1 $\frac{1}{2}$	10	" 3
7	2 40	1 $\frac{1}{2}$ " 2 $\frac{1}{8}$	11	7	3 40	1 $\frac{1}{2}$ " 2 $\frac{1}{8}$	11	" 3
8	2 70	2 $\frac{1}{4}$ " 2 $\frac{1}{8}$	12	8	3 70	2 $\frac{1}{4}$ " 2 $\frac{1}{8}$	12	" 4
9	3 00	2 $\frac{3}{4}$ " 3 $\frac{1}{8}$	13	9	4 50	2 $\frac{3}{4}$ " 3 $\frac{1}{8}$	13	" 4
10	3 40	3 $\frac{1}{2}$ " 3 $\frac{1}{8}$	14	10	4 90	3 $\frac{1}{2}$ " 3 $\frac{1}{8}$	14	" 5
11	5 00	3 $\frac{3}{8}$ " 3 $\frac{1}{8}$	15	11	6 75	3 $\frac{3}{8}$ " 3 $\frac{1}{8}$	15	" 5
12	7 00	4 " 4 $\frac{1}{8}$	16	12	8 75	4 " 4 $\frac{1}{8}$	16	" 5
13	9 00	4 $\frac{1}{2}$ " 4 $\frac{1}{8}$	17	13	10 75	4 $\frac{1}{2}$ " 4 $\frac{1}{8}$	17	" 5
14	12 00	4 $\frac{1}{8}$ " 6	18	14	14 00	4 $\frac{1}{8}$ " 6	18	" 5 or 6
Discount				Discount				

EXTRA BLADES.

For "Stanar" Adjustable Reamers.

These blades are ground to the proper thickness to fit the slots in reamer bodies; but after inserting, they must be ground on centers to the correct diameter.

Hand Reamers.			Shell Reamers.			Chucking Reamers.		
Fitting Reamers of Following Diameters.	List Price, per Set.		Fitting Reamers of Following Diameters.	List Price, per Set.		Fitting Reamers of Following Diameters.	List Price, per Set.	
	Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.
$\frac{1}{16}$ to $\frac{3}{16}$	\$2 75	\$5 25	$\frac{1}{16}$ to $\frac{1}{8}$	\$2 50	\$4 75	$\frac{1}{16}$ to $\frac{1}{8}$	\$2 25	\$4 50
$\frac{1}{8}$ " $\frac{1}{4}$	3 25	7 00	$1\frac{1}{2}$ " $1\frac{1}{8}$	2 75	6 00	$\frac{1}{8}$ " $\frac{1}{4}$	2 50	4 75
$\frac{1}{4}$ " $\frac{3}{8}$	4 50	9 50	$1\frac{3}{8}$ " $2\frac{1}{4}$	3 00	7 25	$1\frac{1}{2}$ " $1\frac{3}{8}$	2 75	6 00
$\frac{3}{8}$ " $\frac{1}{2}$	5 25	11 50	$2\frac{1}{8}$ " $2\frac{1}{2}$	3 50	9 25	$1\frac{3}{8}$ " $2\frac{1}{2}$	3 00	7 25
$\frac{1}{2}$ " $\frac{5}{8}$	6 25	14 00	$2\frac{3}{4}$ " $3\frac{1}{2}$	4 00	10 50	$2\frac{1}{8}$ " $2\frac{3}{4}$	3 50	9 25
$\frac{5}{8}$ " $\frac{3}{4}$	6 75	16 50	$3\frac{1}{8}$ " $3\frac{3}{8}$	4 75	12 50	$2\frac{3}{8}$ " 3	4 00	10 50

Discount.....

FLUTED CHUCKING REAMERS.



Fig. D. 976.

No. 124.

Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.
$\frac{1}{4}$	\$0 90	\$ 3 00	6	$\frac{1}{4}$	$\frac{1}{4}$	\$ 85	\$15 25	11	$\frac{1}{4}$
$\frac{1}{2}$	95	3 25	6	$\frac{1}{2}$	$\frac{1}{2}$	2 90	15 25	11 $\frac{1}{2}$	$\frac{1}{2}$
$\frac{3}{4}$	1 00	3 25	6	$\frac{3}{4}$	$\frac{3}{4}$	3 05	17 00	11 $\frac{1}{2}$	$\frac{3}{4}$
$\frac{7}{8}$	1 05	3 75	6	$\frac{7}{8}$	$\frac{7}{8}$	3 20	18 75	12	2
$1 \frac{1}{8}$	1 10	3 75	7	1	$1 \frac{1}{8}$	3 35	20 50	12	2
$1 \frac{1}{4}$	1 15	4 25	7	1	$1 \frac{1}{4}$	3 50	22 25	12 $\frac{1}{2}$	2 $\frac{1}{2}$
$1 \frac{1}{2}$	1 20	4 25	7	1	$1 \frac{1}{2}$	3 65	24 00	12 $\frac{1}{2}$	2 $\frac{1}{2}$
$1 \frac{3}{4}$	1 25	4 75	7	1	$1 \frac{3}{4}$	3 80	25 75	13	2 $\frac{1}{2}$
2	1 30	4 75	8	1 $\frac{1}{4}$	2	4 00	27 50	13	2 $\frac{1}{2}$
$2 \frac{1}{4}$	1 35	5 25	8	1 $\frac{1}{2}$	$2 \frac{1}{4}$	4 20	29 50	13 $\frac{1}{2}$	2 $\frac{3}{4}$
$2 \frac{1}{2}$	1 40	5 25	8	1 $\frac{3}{4}$	$2 \frac{1}{2}$	4 40	31 50	13 $\frac{1}{2}$	2 $\frac{3}{4}$
$2 \frac{3}{4}$	1 45	5 75	8	2	$2 \frac{3}{4}$	4 60	33 50	14	2 $\frac{3}{4}$
3	1 50	5 75	9	2 $\frac{1}{4}$	3	4 80	35 75	14	2 $\frac{3}{4}$
$3 \frac{1}{4}$	1 55	6 25	9	2 $\frac{1}{2}$	$3 \frac{1}{4}$	5 00	38 00	14	2 $\frac{3}{4}$
$3 \frac{1}{2}$	1 60	6 25	9	2 $\frac{3}{4}$	$3 \frac{1}{2}$	5 30	40 75	14 $\frac{1}{2}$	2 $\frac{3}{4}$
$3 \frac{3}{4}$	1 65	6 75	9	3	$3 \frac{3}{4}$	5 60	43 50	14 $\frac{1}{2}$	2 $\frac{3}{4}$
4	1 70	6 75	9 $\frac{1}{2}$	3 $\frac{1}{4}$	4	5 90	46 25	14 $\frac{1}{2}$	2 $\frac{3}{4}$
$4 \frac{1}{4}$	1 80	7 25	9 $\frac{1}{2}$	3 $\frac{1}{2}$	$4 \frac{1}{4}$	6 20	49 00	14 $\frac{1}{2}$	2 $\frac{3}{4}$
$4 \frac{1}{2}$	1 85	7 25	9 $\frac{1}{2}$	3 $\frac{3}{4}$	$4 \frac{1}{2}$	6 50	51 75	15	3
$4 \frac{3}{4}$	1 90	8 00	9 $\frac{3}{4}$	4	$4 \frac{3}{4}$	6 80	55 00	15	3
5	2 00	8 00	10	4 $\frac{1}{4}$	5	7 10	58 25	15	3
$5 \frac{1}{4}$	2 10	9 00	10	4 $\frac{1}{2}$	$5 \frac{1}{4}$	7 40	61 50	15	3
$5 \frac{1}{2}$	2 15	9 00	10	4 $\frac{3}{4}$	$5 \frac{1}{2}$	7 70	64 75	15 $\frac{1}{2}$	3 $\frac{1}{4}$
$5 \frac{3}{4}$	2 25	10 00	10	5	$5 \frac{3}{4}$	8 00	68 00	15 $\frac{1}{2}$	3 $\frac{1}{4}$
6	2 30	10 00	10 $\frac{1}{2}$	5 $\frac{1}{4}$	6	8 35	71 25	15 $\frac{1}{2}$	3 $\frac{1}{4}$
$6 \frac{1}{4}$	2 40	11 25	10 $\frac{1}{2}$	5 $\frac{1}{2}$	$6 \frac{1}{4}$	8 70	74 50	15 $\frac{1}{2}$	3 $\frac{1}{4}$
$6 \frac{1}{2}$	2 45	11 25	10 $\frac{1}{2}$	5 $\frac{3}{4}$	$6 \frac{1}{2}$	9 00	77 75	16	3 $\frac{1}{4}$
$6 \frac{3}{4}$	2 55	12 50	10 $\frac{1}{2}$	6	$6 \frac{3}{4}$	9 35	81 00	16	3 $\frac{1}{4}$
7	2 60	12 50	11	6 $\frac{1}{4}$	7	9 70	84 25	16	3 $\frac{1}{4}$
$7 \frac{1}{4}$	2 70	13 75	11	6 $\frac{1}{2}$	$7 \frac{1}{4}$	10 00	87 50	16	3 $\frac{1}{4}$
$7 \frac{1}{2}$	2 75	13 75	11	6 $\frac{3}{4}$					

32nd sizes not listed furnished at prices intermediate, and 64th sizes at price of next larger size.

Discount.

ROSE CHUCKING REAMERS.



Fig. D. 977.

No. 124 A.

Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Diam., Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.
1 1/4	\$0 80	\$ 3 00	6	1 1/4	1 1/4	\$ 2 65	\$15 00	11	2 1/4
1 1/2	85	3 25	6	1 1/2	1 1/2	2 70	15 25	11 1/2	3
1 3/4	90	3 25	6	1 3/4	1 3/4	2 85	17 00	11 1/2	3
1 7/8	95	3 75	6	1 7/8	1 7/8	3 00	18 75	12	3 1/4
1 1	1 00	3 75	7	1 1	1 1	3 15	20 50	12	3 1/4
1 1 1/8	1 05	4 25	7	1 1 1/8	1 1 1/8	3 30	22 25	12 1/2	3 3/4
1 1 1/4	1 10	4 25	7	1 1 1/4	1 1 1/4	3 45	24 00	12 1/2	3 3/4
1 1 1/2	1 15	4 75	7	1 1 1/2	1 1 1/2	3 60	25 75	13	3 3/4
1 1 3/4	1 20	4 75	8	2	1 1 3/4	3 75	27 50	13	3 3/4
1 1 7/8	1 25	5 25	8	2	1 1 7/8	3 90	29 50	13 1/2	4
1 2	1 30	5 25	8	2	1 2	4 05	31 50	13 1/2	4
1 2 1/8	1 35	5 75	8	2	1 2 1/8	4 20	33 50	14	4 1/4
1 2 1/4	1 40	5 75	9	2 1/4	1 2 1/4	4 40	35 75	14	4 1/4
1 2 1/2	1 45	6 25	9	2 1/2	2	4 60	38 00	14	4 1/4
1 2 3/4	1 50	6 25	9	2 3/4	2 1/8	4 90	40 75	14 1/2	4 1/2
1 3	1 55	6 75	9	2 3/4	2 3/8	5 20	43 50	14 1/2	4 1/2
1 3 1/8	1 60	6 75	9 1/2	2 3/8	2 1/2	5 50	46 25	14 1/2	4 1/2
1 3 1/4	1 65	7 25	9 1/2	2 3/4	2 3/4	5 80	49 00	14 1/2	4 1/2
1 3 1/2	1 70	7 25	9 1/2	2 3/2	2 5/8	6 10	51 75	15	4 3/4
1 3 3/4	1 75	8 00	9 1/2	2 3/2	2 3/8	6 40	55 00	15	4 3/4
1 4	1 80	8 00	10	2 3/8	2 7/8	6 80	58 25	15	4 3/4
1 4 1/8	1 90	9 00	10	2 3/8	2 1/2	7 20	61 50	15	4 3/4
1 4 1/4	1 95	9 00	10	2 3/8	2 5/8	7 50	64 75	15 1/2	5
1 4 1/2	2 05	10 00	10	2 3/8	2 3/8	7 80	68 00	15 1/2	5
1 4 3/4	2 10	10 00	10 1/2	2 3/4	2 1/2	8 10	71 25	15 1/2	5
1 5	2 20	11 25	10 1/2	2 3/4	2 3/4	8 40	74 50	15 1/2	5
1 5 1/8	2 25	11 25	10 1/2	2 3/4	2 1/2	8 80	77 75	16	5 1/4
1 5 1/4	2 35	12 50	10 1/2	2 3/4	2 1/2	9 20	81 00	16	5 1/4
1 5 1/2	2 40	12 50	11	2 3/4	2 1/2	9 60	84 25	16	5 1/4
1 5 3/4	2 50	13 75	11	2 3/4	3	10 00	87 50	16	5 1/4
1 6	2 55	13 75	11	2 3/4					

These reamers have a flute for each cutting edge, which relieves the reamer and prevents the chips crowding in on the surface and binding.

32d sizes not listed furnished at prices intermediate, and 64th sizes at prices of next larger size.

Discount.....

FLUTED CHUCKING REAMERS.

With Taper Shanks.



Fig. D. 978.

No. 124 B.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Standard Taper Shank.	Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Standard Taper Shank.
$\frac{1}{4}$	\$1 20	\$ 3 50	6		No. 1.	$\frac{1}{4}$	\$3 50	\$16 25	11		No. 4.
$\frac{1}{8}$	1 20	3 75	6			$\frac{1}{8}$	3 70	18 00	11		
$\frac{1}{16}$	1 30	3 75	6			$\frac{1}{16}$	3 95	19 75	12		
$\frac{3}{32}$	1 30	4 25	6			$\frac{3}{32}$	4 15	21 50	12		
$\frac{1}{8}$	1 45	4 25	7	1		$\frac{1}{8}$	4 40	23 25	12		
$\frac{3}{16}$	1 50	4 75	7	1		$\frac{3}{16}$	4 60	25 00	12		
$\frac{1}{4}$	1 55	4 75	7	1		$\frac{1}{4}$	4 85	26 75	13		
$\frac{5}{16}$	1 60	5 25	7	1		$\frac{5}{16}$	5 10	28 50	13		
$\frac{3}{8}$	1 65	5 25	8	1		$\frac{3}{8}$	5 30	30 50	13		
$\frac{7}{16}$	1 70	5 75	8	1		$\frac{7}{16}$	5 50	32 50	13		
$\frac{1}{2}$	1 75	5 75	8	1		$\frac{1}{2}$	5 70	34 50	14		
$\frac{9}{16}$	1 80	6 25	8	1	No. 2.	$\frac{9}{16}$	5 95	36 75	14		No. 5.
$\frac{5}{8}$	1 90	6 25	9	1		$\frac{5}{8}$	6 20	39 00	14		
$\frac{11}{16}$	1 95	6 75	9	1		$\frac{11}{16}$	6 50	41 75	14		
$\frac{3}{4}$	2 00	6 75	9	1		$\frac{3}{4}$	6 80	44 50	14		
$\frac{13}{16}$	2 10	7 25	9	1		$\frac{13}{16}$	7 10	47 25	14		
$\frac{7}{8}$	2 20	7 25	9	1		$\frac{7}{8}$	7 40	50 00	14		
$\frac{15}{16}$	2 30	8 00	9	1		$\frac{15}{16}$	7 70	53 25	15		
1	2 40	8 00	9	1		1	8 00	56 50	15		
$1 \frac{1}{16}$	2 50	9 00	9	1		$1 \frac{1}{16}$	8 40	59 75	15		
$1 \frac{1}{8}$	2 55	9 00	10	1		$1 \frac{1}{8}$	8 80	63 00	15		
$1 \frac{1}{4}$	2 60	10 00	10	1		$1 \frac{1}{4}$	9 20	66 25	15		
$1 \frac{3}{8}$	2 65	10 00	10	1	No. 3.	$1 \frac{3}{8}$	9 60	69 50	15		
$1 \frac{1}{2}$	2 70	11 00	10	1		$1 \frac{1}{2}$	10 00	72 75	15		
$1 \frac{5}{8}$	2 75	11 00	10	1		$1 \frac{5}{8}$	10 40	76 00	15		
$1 \frac{3}{4}$	2 80	12 25	10	1		$1 \frac{3}{4}$	10 80	79 25	16		
$1 \frac{7}{8}$	2 85	12 25	10	1		$1 \frac{7}{8}$	11 20	82 50	16		
2	2 95	13 50	10	1		2	11 60	86 25	16		
$2 \frac{1}{8}$	3 10	13 50	11	1		$2 \frac{1}{8}$	12 00	90 00	16		
$2 \frac{1}{4}$	3 20	14 75	11	1							
$2 \frac{3}{8}$	3 30	14 75	11	1							
$2 \frac{1}{2}$	3 40	16 25	11	1							

We will furnish the above reamers
to order .004 to .010 undersize
at regular prices.

32d sizes not listed furnished at prices intermediate, and 64th sizes at price
of next larger size.

Discount

ROSE CHUCKING REAMERS.

With Taper Shanks.

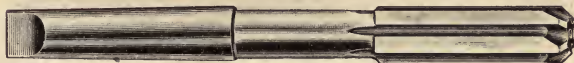


Fig. D. 979.

No. 124 C.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length, Flute, Inches.	Standard Taper Shank.	Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length, Flute, Inches.	Standard Taper Shank
$1\frac{1}{4}$	\$1 20	3 50	6	$1\frac{1}{2}$	No. 1.	$1\frac{1}{4}$	\$3 50	\$16 25	$11\frac{1}{2}$	3	No. 4.
$1\frac{1}{8}$	1 20	3 75	6	$1\frac{1}{2}$		$1\frac{1}{8}$	3 70	18 00	$11\frac{1}{2}$	3	
$1\frac{1}{2}$	1 30	3 75	6	$1\frac{1}{2}$		$1\frac{1}{2}$	3 95	19 75	12	$3\frac{1}{2}$	
$1\frac{3}{8}$	1 30	4 25	6	$1\frac{1}{2}$		$1\frac{3}{8}$	4 15	21 50	12	$3\frac{3}{4}$	
$1\frac{1}{2}$	1 45	4 25	7	$1\frac{1}{2}$		$1\frac{1}{2}$	4 40	23 25	$12\frac{1}{2}$	$3\frac{3}{4}$	
$1\frac{5}{8}$	1 50	4 75	7	$1\frac{1}{2}$		$1\frac{5}{8}$	4 60	25 00	$12\frac{1}{2}$	$3\frac{3}{4}$	
$1\frac{1}{2}$	1 55	4 75	7	$1\frac{1}{2}$		$1\frac{1}{2}$	4 85	26 75	13	$3\frac{3}{4}$	
$1\frac{6}{8}$	1 60	5 25	7	$1\frac{1}{2}$		$1\frac{6}{8}$	5 10	28 50	13	$3\frac{3}{4}$	
$1\frac{6}{8}$	1 65	5 25	8	2		$1\frac{6}{8}$	5 30	30 50	$13\frac{1}{2}$	4	
$1\frac{7}{8}$	1 70	5 75	8	2		$1\frac{7}{8}$	5 50	32 50	$13\frac{1}{2}$	4	
$1\frac{7}{8}$	1 75	5 75	8	2	No. 2.	$1\frac{7}{8}$	5 70	34 50	14	$4\frac{1}{4}$	No. 5.
$1\frac{8}{8}$	1 80	6 25	8	2		$1\frac{8}{8}$	5 95	36 75	14	$4\frac{1}{4}$	
$1\frac{9}{8}$	1 90	6 25	9	$2\frac{1}{4}$		2	6 20	39 00	14	$4\frac{1}{4}$	
$1\frac{9}{8}$	1 95	6 75	9	$2\frac{1}{4}$		2	6 50	41 75	$14\frac{1}{2}$	$4\frac{1}{4}$	
2 00	6 75	9	$2\frac{1}{4}$	$2\frac{1}{4}$		$2\frac{1}{8}$	6 80	44 50	$14\frac{1}{2}$	$4\frac{1}{4}$	
2 10	7 25	9	$2\frac{1}{4}$	$2\frac{1}{4}$		2	7 10	47 25	$14\frac{1}{2}$	$4\frac{1}{4}$	
2 20	7 25	9	$2\frac{1}{4}$	$2\frac{1}{4}$		$2\frac{1}{4}$	7 40	50 00	$14\frac{1}{2}$	$4\frac{1}{4}$	
2 30	8 00	9	$2\frac{1}{4}$	$2\frac{1}{4}$		$2\frac{1}{4}$	7 70	53 25	15	$4\frac{1}{4}$	
2 40	8 00	9	$2\frac{1}{4}$	$2\frac{1}{4}$		$2\frac{3}{8}$	8 00	56 50	15	$4\frac{1}{4}$	
2 50	9 00	9	$2\frac{1}{4}$	$2\frac{1}{4}$		2	8 40	59 75	15	$4\frac{1}{4}$	
2 55	9 00	10	2	2	No. 3.	$2\frac{1}{2}$	8 80	63 00	15	$4\frac{1}{4}$	
2 60	10 00	10	2	2		$2\frac{1}{2}$	9 20	66 25	$15\frac{1}{2}$	5	
2 65	10 00	10	2	2		$2\frac{5}{8}$	9 60	69 50	$15\frac{1}{2}$	5	
2 70	11 00	10	2	2		$2\frac{5}{8}$	10 00	72 75	$15\frac{1}{2}$	5	
2 75	11 00	10	2	2		$2\frac{3}{4}$	10 40	76 00	$15\frac{1}{2}$	5	
2 80	12 25	10	2	2		$2\frac{3}{4}$	10 80	79 25	16	$5\frac{1}{4}$	
2 85	12 25	10	2	2		2	11 20	82 50	16	$5\frac{1}{4}$	
2 95	13 50	10	2	2		$2\frac{7}{8}$	11 60	86 25	16	$5\frac{1}{4}$	
3 10	13 50	11	2	2		3	12 00	90 00	16	$5\frac{1}{4}$	
3 20	14 75	11	2	2							
3 30	14 75	11	2	2							
3 40	16 25	11	2	2							

The above reamers have a flute for each cutting edge.

Discount

THREE GROOVE CHUCKING REAMERS.

With Taper Shanks.

These tools are specially adapted for drilling and reaming cored holes. No finishing reamer required for ordinary work.



Fig. D. 980.
No. 124 F.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Standard Taper Shank.	Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Standard Taper Shank.
$\frac{1}{4}$	\$1 50	6 $\frac{1}{2}$	No. 1	$\frac{1}{4}$	\$5 20	\$18 25	14 $\frac{1}{2}$	No. 4
$\frac{3}{8}$	1 60	.....	6 $\frac{1}{2}$		$\frac{3}{8}$	5 40	19 75	14 $\frac{1}{2}$
$\frac{1}{2}$	1 60	.....	6 $\frac{1}{2}$		$\frac{1}{2}$	5 60	19 75	14 $\frac{1}{2}$
$\frac{5}{8}$	1 70	.....	6 $\frac{1}{2}$		$\frac{5}{8}$	5 80	21 50	14 $\frac{1}{2}$
$\frac{3}{4}$	1 70	\$4 75	6 $\frac{1}{2}$		$\frac{3}{4}$	6 00	21 50	14 $\frac{1}{2}$	
$\frac{7}{8}$	1 75	5 25	7		$\frac{7}{8}$	6 20	23 25	14 $\frac{1}{2}$	
$\frac{1}{2}$	1 80	5 25	7 $\frac{1}{2}$		$\frac{1}{2}$	6 40	23 25	15	
$\frac{3}{4}$	1 85	5 75	7 $\frac{1}{2}$		$\frac{3}{4}$	6 70	25 00	15 $\frac{1}{2}$	
$\frac{1}{2}$	1 90	5 75	7 $\frac{1}{2}$		$\frac{1}{2}$	6 90	25 00	15 $\frac{1}{2}$	
$\frac{1}{2}$					$\frac{1}{2}$	7 25	26 75	15 $\frac{1}{2}$	
$\frac{1}{2}$				No. 2	$\frac{1}{2}$	7 40	26 75	15 $\frac{1}{2}$	No. 4
$\frac{1}{2}$	1 95	6 25	8		$\frac{1}{2}$	7 65	28 50	15 $\frac{1}{2}$	
$\frac{1}{2}$	2 00	6 25	8 $\frac{1}{2}$		$\frac{1}{2}$	7 90	28 50	15 $\frac{1}{2}$	
$\frac{1}{2}$	2 30	6 75	8 $\frac{1}{2}$		$\frac{1}{2}$				
$\frac{1}{2}$	2 60	6 75	8 $\frac{1}{2}$		$\frac{1}{2}$				
$\frac{1}{2}$	2 70	7 25	9		$\frac{1}{2}$	8 15	30 50	15 $\frac{1}{2}$	
$\frac{1}{2}$	2 75	7 25	9 $\frac{1}{2}$		$\frac{1}{2}$	8 40	30 50	16	
$\frac{1}{2}$	2 85	7 75	9 $\frac{1}{2}$		$\frac{1}{2}$	8 60	32 50	16 $\frac{1}{2}$	
$\frac{1}{2}$	2 90	7 75	9 $\frac{1}{2}$		$\frac{1}{2}$	8 80	32 50	16 $\frac{1}{2}$	
$\frac{1}{2}$	3 00	8 50	9 $\frac{1}{2}$		$\frac{1}{2}$	9 00	34 50	16 $\frac{1}{2}$	
$\frac{1}{2}$	3 05	8 50	10	No. 3	$\frac{1}{2}$	9 20	34 50	16 $\frac{1}{2}$	No. 5
$\frac{1}{2}$	3 15	9 50	10 $\frac{1}{2}$		$\frac{1}{2}$	9 40	36 75	16 $\frac{1}{2}$	
$\frac{1}{2}$	3 20	9 50	10 $\frac{1}{2}$		$\frac{1}{2}$	9 50	36 75	16 $\frac{1}{2}$	
$\frac{1}{2}$					$\frac{1}{2}$	9 70	39 00	16 $\frac{1}{2}$	
$\frac{1}{2}$					$\frac{1}{2}$	9 80	39 00	16 $\frac{1}{2}$	
$\frac{1}{2}$	3 30	10 50	10 $\frac{1}{2}$		$\frac{1}{2}$	10 60	41 75	17	
$\frac{1}{2}$	3 40	10 50	10 $\frac{1}{2}$		$\frac{1}{2}$	11 20	44 50	17	
$\frac{1}{2}$	3 50	11 50	10 $\frac{1}{2}$		$\frac{1}{2}$	12 00	47 25	17	
$\frac{1}{2}$	3 60	11 50	11		$\frac{1}{2}$	12 80	50 00	17 $\frac{1}{2}$	
$\frac{1}{2}$	3 70	12 50	11 $\frac{1}{2}$		$\frac{1}{2}$	13 60	53 25	17 $\frac{1}{2}$	
$\frac{1}{2}$	3 80	12 50	11 $\frac{1}{2}$	No. 4	$\frac{1}{2}$	14 40	56 50	18	No. 5
$\frac{1}{2}$	3 90	13 75	11 $\frac{1}{2}$		$\frac{1}{2}$	15 00	59 75	18 $\frac{1}{2}$	
$\frac{1}{2}$	4 00	13 75	11 $\frac{1}{2}$		$\frac{1}{2}$	15 60	63 00	19	
$\frac{1}{2}$	4 25	15 25	11 $\frac{1}{2}$		$\frac{1}{2}$	16 80	69 50	19 $\frac{1}{2}$	
$\frac{1}{2}$	4 50	15 25	12		$\frac{1}{2}$	19 00	76 00	20 $\frac{1}{2}$	
$\frac{1}{2}$					$\frac{1}{2}$	21 00	82 50	21	
$\frac{1}{2}$					$\frac{1}{2}$	25 00	90 00	22	
$\frac{1}{2}$					$\frac{1}{2}$				
$\frac{1}{2}$					$\frac{1}{2}$				
$\frac{1}{2}$					$\frac{1}{2}$				

Special lengths made to order.

32d sizes not listed furnished at prices intermediate, and 64th sizes at price of next larger size.

Discount.....

THREE GROOVE CHUCKING REAMERS.

With Straight Shanks.

For Screw or Chucking Machines.



Fig. D. 981.

No. 124-G.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Diameter Shank, Inches.	Length Shank, Inches.	Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Diameter Shank, Inches.	Length Shank, Inches.
1/16	\$1 50	...	6 1/2	1/16	1 1/2	1/16	\$ 5 00	\$18 25	14 1/2	1/16	3
1/8	1 60	...	6 3/4	1/8	1 1/2	1/8	5 20	18 25	14 3/4	1/8	3 3/4
3/16	1 60	...	6 3/4	3/16	1 1/2	3/16	5 40	19 75	14 3/4	3/16	3 3/4
1/4	1 70	...	6 3/4	1/4	1 1/2	1/4	5 60	19 75	14 3/4	1/4	3 3/4
5/16	1 70	...	6 3/4	5/16	1 1/2	5/16	5 80	21 50	14 3/4	5/16	3 3/4
3/8	1 75	\$4 75	6 3/4	3/8	1 1/2	3/8	6 00	21 50	14 3/4	3/8	3 3/4
7/16	1 80	5 25	7 1/4	7/16	1 1/2	7/16	6 20	23 25	14 3/4	7/16	3 3/4
1/2	1 85	5 75	7 3/4	1/2	1 1/2	1/2	6 40	23 25	15 1/4	1/2	3 3/4
5/8	1 90	5 75	7 3/4	5/8	2	5/8	6 70	25 00	15 1/4	5/8	3 3/4
3/4	1 95	6 25	8	3/4	2	3/4	6 90	25 00	15 1/4	3/4	3 3/4
7/8	2 00	6 25	8 1/4	7/8	2	7/8	7 25	26 75	15 1/4	7/8	3 3/4
1	2 30	6 75	8 3/4	1	2 1/4	1	7 40	26 75	15 1/4	1	3 3/4
1 1/16	2 60	6 75	8 3/4	1 1/16	2 1/4	1 1/16	7 65	28 50	15 1/4	1 1/16	3 3/4
1 1/8	2 70	7 25	9	1 1/8	2 1/4	1 1/8	7 90	28 50	15 1/4	1 1/8	3 3/4
1 1/4	2 75	7 25	9 1/4	1 1/4	2 1/4	1 1/4	8 15	30 50	15 1/4	1 1/4	3 3/4
1 1/2	2 85	7 75	9 3/4	1 1/2	2 1/4	1 1/2	8 40	30 50	16	1 1/2	3 3/4
1 3/4	2 90	7 75	9 3/4	1 3/4	2 1/4	1 3/4	8 60	32 50	16 1/4	1 3/4	3 3/4
2	3 00	8 50	9 3/4	2	2 1/4	2	8 80	32 50	16 1/4	2	3 3/4
2 1/16	3 05	8 50	10	2 1/16	2 1/4	2 1/16	9 20	34 50	16 1/4	2 1/16	3 3/4
2 1/8	3 15	9 50	10 1/4	2 1/8	2 1/4	2 1/8	9 50	36 75	16 1/4	2 1/8	3 3/4
2 1/4	3 20	9 50	10 3/4	2 1/4	2 1/4	2 1/4	9 80	39 00	16 1/4	2 1/4	3 3/4
2 3/8	3 30	10 50	10 3/4	2 3/8	2 1/4	2 3/8	10 60	41 75	17	2 3/8	3 3/4
2 1/2	3 40	10 50	10 3/4	2 1/2	2 1/4	2 1/2	11 20	44 50	17	2 1/2	3 3/4
2 5/8	3 50	11 50	10 3/4	2 5/8	2 1/4	2 5/8	12 00	47 25	17	2 5/8	3 3/4
2 3/4	3 60	11 50	11	2 3/4	2 1/4	2 3/4	12 80	50 00	17 1/4	2 3/4	3 3/4
3	3 70	12 50	11 1/4	3	2 1/4	3	13 60	53 25	17 3/4	3	3 3/4
3 1/16	3 80	12 50	11 1/4	3 1/16	2 1/4	3 1/16	14 40	56 50	18	3 1/16	3 3/4
3 1/8	3 90	13 75	11 1/4	3 1/8	2 1/4	3 1/8	15 00	59 75	18 1/4	3 1/8	3 3/4
3 1/4	4 00	13 75	11 1/4	3 1/4	2 1/4	3 1/4	15 60	63 00	19	3 1/4	3 3/4
3 3/8	4 25	15 25	11 3/4	3 3/8	2 1/4	3 3/8	16 80	69 50	19 1/4	3 3/8	3 3/4
3 1/2	4 50	15 25	12	3 1/2	2 1/4	3 1/2	19 00	76 00	20 1/4	3 1/2	3 3/4
3 5/8	4 70	16 75	12 1/4	3 5/8	2 1/4	3 5/8	21 00	82 50	21	3 5/8	4
4	4 80	16 75	12 3/4	4	3	4	25 00	90 00	22	4	4

32d sizes not listed, furnished at prices intermediate, and 64th sizes at price of next larger size.

Discount

STANDARD TAPER PIN REAMERS.



Fig. D. 982. No 126.

Taper $\frac{1}{4}$ inch per foot.

No.	Price, Each.	Diam. Small End.	Length Flute, Inches.	Length Over All, Inches.	No.	Price, Each.	Diam. Small End.	Length Flute, Inches.	Length Over All, Inches.
0	\$1 00	.135	1 $\frac{1}{4}$	2 $\frac{1}{4}$	8	\$3 00	.398	5 $\frac{1}{4}$	6 $\frac{1}{4}$
1	1 00	.146	1 $\frac{3}{4}$	2 $\frac{3}{4}$	9	3 50	.482	6 $\frac{1}{4}$	8
2	1 25	.162	2	3	10	4 00	.581	7	9
3	1 50	.183	2 $\frac{1}{4}$	3 $\frac{1}{4}$	11	4 75	.706	8 $\frac{1}{4}$	11 $\frac{1}{4}$
4	1.75	.208	2 $\frac{3}{4}$	4	12	5 50	.842	10	13 $\frac{1}{4}$
5	2 00	.240	3	4 $\frac{1}{4}$	13	6 50	1.009	12	16
6	2 25	.279	3 $\frac{1}{4}$	5	14	7 75	1.250	14	18 $\frac{1}{4}$
7	2 50	.331	4 $\frac{1}{4}$	6					

These reamers have the same taper, and each will overlay in convenient measure the size next smaller. The diameter is taken at extreme end. Special sizes made to order.

Discount.....

STANDARD TAPER PINS.



Fig. D. 983. No. 160.

Price Per Hundred.

Number.	0	1	2	3	4	5	6	7	8	9	10
Diam. Large End, Inches.	.156	.172	.193	.219	.250	.289	.341	.409	.492	.591	.706
Approximate Fractional Sizes	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{2}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{11}{16}$	$\frac{3}{4}$
Length, Inches.											
1 $\frac{1}{4}$	\$1 80	\$2 00	\$2 10	\$2 30	\$2 50	\$2 75	\$3 00	.....	.....	.....	.....
1 $\frac{1}{2}$	2 05	2 25	2 35	2 55	2 75	3 00	3 25	\$3 75	.....	.....	.....
1 $\frac{3}{4}$	2 30	2 50	2 60	2 80	3 00	3 25	3 50	4 00	\$4 65	.....	.....
2	2 55	2 75	2 85	3 05	3 25	3 50	3 75	4 25	5 00	\$7 00	\$9 00
2 $\frac{1}{4}$	2 80	3 00	3 10	3 30	3 50	3 75	4 00	4 50	5 40	7 50	9 50
2 $\frac{1}{2}$	.....	3 25	3 35	3 55	3 75	4 05	4 35	4 75	5 80	8 00	10 00
2 $\frac{3}{4}$	.....	.....	3 60	3 80	4 00	4 40	4 75	5 25	6 25	8 60	10 75
3	.....	.....	.....	4 05	4 25	4 75	5 20	5 75	6 75	9 20	11 50
3 $\frac{1}{4}$	.....	.....	.....	4 30	4 50	5 10	5 70	6 25	7 25	9 80	12 25
3 $\frac{1}{2}$	.....	.....	.....	4 55	4 75	5 45	6 25	6 75	7 80	10 50	13 25
3 $\frac{3}{4}$	.....	.....	.....	.....	.....	.....	6 75	7 25	8 40	11 20	14 25
4	.....	.....	.....	.....	.....	.....	7 25	7 75	9 00	11 90	15 25
4 $\frac{1}{4}$	.....	.....	.....	.....	.....	.....	7 75	8 25	9 60	12 60	16 25
4 $\frac{1}{2}$	.....	.....	.....	.....	.....	.....	8 25	8 75	10 20	13 30	17 25
4 $\frac{3}{4}$	.....	.....	.....	.....	.....	.....	.....	.....	10 80	14 00	18 25
5	.....	.....	.....	.....	.....	.....	.....	.....	11 40	14 70	19 25

Taper $\frac{1}{4}$ inch to the foot. If ordering sizes other than those included in the above list, furnish the length and the size at the larger end.

Discount.....

STANDARD TAPER REAMERS.

For Locomotive Work.

Taper $\frac{1}{8}$ Inch per Foot. Fig. D. 984. No. 127.

Diam. at End, Inches.	Price, Each.	Length Flute, Inches.	Total Length, Inches.	Diam. at End, Inches.	Price, Each.	Length Flute, Inches.	Total Length, Inches.
$\frac{1}{4}$	\$2 20	4	5 $\frac{1}{8}$	$1 \frac{1}{8}$	\$ 5 70	9	11 $\frac{1}{4}$
$\frac{3}{8}$	2 20	4	5 $\frac{1}{8}$	$1 \frac{1}{8}$	6 20	10	12 $\frac{1}{4}$
$\frac{1}{2}$	2 25	4	5 $\frac{1}{8}$	$1 \frac{1}{4}$	6 60	10	12 $\frac{1}{4}$
$\frac{5}{8}$	2 25	4	5 $\frac{1}{8}$	$1 \frac{1}{4}$	7 00	10	12 $\frac{1}{4}$
$\frac{3}{4}$	2 30	5	6 $\frac{1}{8}$	$1 \frac{1}{4}$	7 60	12	14 $\frac{1}{2}$
$\frac{7}{8}$	2 40	5	6 $\frac{1}{8}$	$1 \frac{3}{8}$	8 00	12	14 $\frac{1}{2}$
$1 \frac{1}{8}$	2 55	6	7 $\frac{1}{8}$	$1 \frac{3}{8}$	8 50	12	14 $\frac{1}{2}$
$1 \frac{1}{4}$	2 70	6	7 $\frac{1}{8}$	$1 \frac{3}{8}$	9 00	12	14 $\frac{1}{2}$
$1 \frac{1}{2}$	3 00	7	8 $\frac{1}{8}$	$1 \frac{5}{8}$	9 60	12	14 $\frac{1}{2}$
$1 \frac{3}{4}$	3 20	8	9 $\frac{1}{8}$	$1 \frac{5}{8}$	10 20	14	16 $\frac{1}{2}$
$2 \frac{1}{8}$	3 50	8	9 $\frac{1}{8}$	$1 \frac{5}{8}$	10 85	14	16 $\frac{1}{2}$
$2 \frac{1}{4}$	3 80	8	9 $\frac{1}{8}$	$1 \frac{3}{4}$	11 60	14	16 $\frac{1}{2}$
$2 \frac{1}{2}$	4 10	8	9 $\frac{1}{8}$	$1 \frac{3}{4}$	12 40	14	16 $\frac{1}{2}$
$2 \frac{3}{4}$	4 50	9	11 $\frac{1}{4}$	$1 \frac{3}{4}$	13 25	14	16 $\frac{1}{2}$
$3 \frac{1}{8}$	4 80	9	11 $\frac{1}{4}$	$1 \frac{3}{4}$	14 25	14	16 $\frac{1}{2}$
$3 \frac{1}{4}$	5 10	9	11 $\frac{1}{4}$	2	15 25	14	16 $\frac{1}{2}$
$3 \frac{1}{2}$	5 40	9	11 $\frac{1}{4}$				

Discount.....

TAPER SHANK TAPER REAMERS.

For Locomotive Work.

Taper $\frac{1}{8}$ inch per foot. Fig. D. 985. No. 127 A.

Diameter at End, Inches.	Price, Each.	Length Over All, Inches.	Length Flute, Inches.	Standard Taper Shank.	Diameter at End, Inches.	Price, Each.	Length Over All, Inches.	Length Flute, Inches.	Standard Taper Shank.
$\frac{1}{4}$	\$3 10	7 $\frac{1}{8}$	4	No. 1	$1 \frac{1}{8}$	\$6 60	13 $\frac{1}{2}$	9	No. 3
$\frac{3}{8}$	3 10	7 $\frac{1}{8}$	4		$1 \frac{1}{8}$	6 80	14 $\frac{1}{2}$	10	
$\frac{1}{2}$	3 15	7 $\frac{1}{8}$	4		$1 \frac{1}{8}$	7 25	14 $\frac{1}{2}$	10	
$\frac{5}{8}$	3 15	7 $\frac{1}{8}$	4		$1 \frac{1}{4}$	7 70	15 $\frac{1}{2}$	10	
$\frac{3}{4}$	3 20	8 $\frac{1}{8}$	5		$1 \frac{1}{4}$	8 35	17 $\frac{1}{2}$	12	
$\frac{7}{8}$	3 25	8 $\frac{1}{8}$	5		$1 \frac{3}{8}$	8 80	17 $\frac{1}{2}$	12	No. 4
$1 \frac{1}{8}$	3 30	9 $\frac{1}{8}$	6		$1 \frac{3}{8}$	9 35	17 $\frac{1}{2}$	12	
$1 \frac{1}{4}$	3 45	9 $\frac{1}{8}$	6		$1 \frac{3}{8}$	9 90	17 $\frac{1}{2}$	12	
$1 \frac{1}{2}$	3 50	10 $\frac{1}{8}$	7		$1 \frac{5}{8}$	10 55	19 $\frac{1}{2}$	14	
$1 \frac{3}{4}$	3 50	11 $\frac{1}{8}$	8		$1 \frac{5}{8}$	11 20	19 $\frac{1}{2}$	14	
$2 \frac{1}{8}$	4 00	11 $\frac{1}{8}$	8	No. 2	$1 \frac{3}{4}$	11 95	19 $\frac{1}{2}$	14	No. 5
$2 \frac{1}{4}$	4 50	11 $\frac{1}{8}$	8		$1 \frac{3}{4}$	12 75	20 $\frac{3}{4}$	14	
$2 \frac{1}{2}$	4 90	12 $\frac{1}{8}$	8		$1 \frac{3}{4}$	13 65	22 $\frac{3}{4}$	16	
$2 \frac{3}{4}$	5 30	12 $\frac{1}{8}$	9		$1 \frac{3}{4}$	14 60	22 $\frac{3}{4}$	16	
$3 \frac{1}{8}$	5 70	12 $\frac{1}{8}$	9		$1 \frac{3}{4}$	15 70	22 $\frac{3}{4}$	16	
$3 \frac{1}{4}$	6 05	13 $\frac{1}{2}$	9	No. 3	2	16 80	22 $\frac{3}{4}$	16	
$3 \frac{1}{2}$	6 40	13 $\frac{1}{2}$	9						

Reamers of other taper per foot, length of flute, etc., than specified above, made to order. Can also furnish taper $\frac{3}{32}$ inch per foot at same price when so specified. This also applies to Fig. D. 984, No. 127.

Discount.....

REAMERS FOR HEAVY IRON WORK.

With Taper Shanks.



Fig. D. 986. No. 129 A.

For use in pneumatic tools for Boiler, Bridge, Ship and Structural Iron Work.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Standard Taper Shank.
$\frac{1}{2}$	\$2 75	\$4 00	9	$5\frac{1}{2}$	No. 2.
$\frac{5}{8}$	2 80	4 25	9	$5\frac{1}{2}$	
$\frac{3}{4}$	2 90	4 50	10	$6\frac{1}{2}$	
$\frac{7}{8}$	3 00	4 75	11	$6\frac{1}{2}$	
$\frac{1}{2}$	3 10	5 00	12	$7\frac{1}{2}$	No. 3.
$\frac{3}{4}$	3 30	5 30	12	$7\frac{1}{2}$	
$\frac{7}{8}$	3 50	5 70	12	$7\frac{1}{2}$	
$\frac{1}{2}$	3 70	6 00	12	$7\frac{1}{2}$	
1	3 90	6 50	12	$7\frac{1}{2}$	
$1\frac{1}{8}$	4 00	7 00	12	$7\frac{1}{2}$	
$1\frac{1}{4}$	4 30	7 50	12	$7\frac{1}{2}$	
$1\frac{3}{8}$	4 60	8 00	12	$7\frac{1}{2}$	
$1\frac{1}{2}$	4 90	8 75	12	$7\frac{1}{2}$	No. 4.
$1\frac{3}{4}$	5 20	9 50	13	$7\frac{1}{2}$	
$1\frac{7}{8}$	5 60	10 50	13	$7\frac{1}{2}$	
$1\frac{1}{2}$	6 00	12 00	13	$7\frac{1}{2}$	
$1\frac{1}{2}$	6 40	14 00	13	$7\frac{1}{2}$	

These reamers are tapered on the end to facilitate entering the work.

Discount.....

With Squared Shanks.



Fig. D. 987. No. 129 B.

For use in pneumatic tools for Boiler, Bridge, Ship and Structural Iron Work.

Diameter, Inches.	Price Each, Carbon Steel.	Price Each, High Speed Steel.	Length Over All, Inches.	Length Flute, Inches.	Length Tapered End, Inches.
$\frac{1}{2}$	\$2 75	\$3 30	$6\frac{1}{2}$	$5\frac{1}{2}$	3
$\frac{5}{8}$	2 80	3 50	$7\frac{1}{2}$	$5\frac{1}{2}$	3
$\frac{3}{4}$	2 90	3 70	$8\frac{1}{2}$	$6\frac{1}{2}$	3
$\frac{7}{8}$	3 00	3 90	$8\frac{1}{2}$	$6\frac{1}{2}$	3
$\frac{1}{2}$	3 10	4 10	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$\frac{3}{4}$	3 30	4 40	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$\frac{7}{8}$	3 50	4 70	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$\frac{1}{2}$	3 70	5 00	$10\frac{1}{2}$	$7\frac{1}{2}$	3
1	3 90	5 30	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{1}{8}$	4 00	5 85	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{1}{4}$	4 30	6 40	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{3}{8}$	4 60	6 95	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{1}{2}$	4 90	7 50	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{3}{4}$	5 20	8 25	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{7}{8}$	5 60	9 00	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{1}{2}$	6 00	10 00	$10\frac{1}{2}$	$7\frac{1}{2}$	3
$1\frac{1}{2}$	6 40	11 00	$10\frac{1}{2}$	$7\frac{1}{2}$	3

These reamers are tapered on the end to facilitate entering the work.

Discount.....

STRAIGHT FLUTED END MILLS.

With Standard Taper Shanks.



Fig. D. 988.

Left Hand Mill.

No. 138 B Carbon Steel.

No. 761 High Speed Steel.

Diameter, Inches.	Standard Taper No.	Length Cut, Inches.	Length Over All, Inches.	Price, Each.		Diameter, Inches.	Standard Taper No.	Length Cut, Inches.	Length Over All, Inches.	Price, Each.	
				Carbon Steel.	High Speed Steel.					Carbon Steel.	High Speed Steel.
$\frac{1}{4}$	1	$\frac{1}{8}$	$3\frac{3}{4}$	\$1 15	\$1 70	1	3	$\frac{1}{8}$	$6\frac{5}{8}$	\$2 30	\$4 00
$\frac{3}{8}$	1	$\frac{1}{8}$	$3\frac{1}{2}$	1 15	1 70	$1\frac{1}{8}$	2	$\frac{1}{8}$	$5\frac{3}{8}$	2 15	3 75
$\frac{1}{2}$	1	$\frac{1}{8}$	$3\frac{1}{4}$	1 20	1 75	$1\frac{1}{4}$	3	$\frac{1}{8}$	$6\frac{1}{4}$	2 30	4 05
$\frac{5}{8}$	1	$\frac{1}{8}$	$3\frac{1}{8}$	1 25	1 85	$1\frac{3}{8}$	3	2	$6\frac{1}{8}$	2 35	4 25
$\frac{7}{8}$	2	$\frac{1}{8}$	$4\frac{1}{8}$	1 40	2 25	$1\frac{1}{2}$	2	2	$6\frac{3}{4}$	2 40	4 45
1	1	1	$4\frac{3}{8}$	1 30	1 90	$1\frac{3}{4}$	3	2	$6\frac{3}{4}$	2 45	4 65
	2	$1\frac{1}{8}$	$4\frac{5}{8}$	1 45	2 30	$1\frac{7}{8}$	4	2	$7\frac{1}{8}$	2 55	5 00
	1	$1\frac{1}{4}$	$3\frac{1}{2}$	1 35	2 00	$1\frac{7}{8}$	3	$2\frac{1}{4}$	$6\frac{1}{2}$	2 65	5 10
	2	$1\frac{1}{2}$	$4\frac{3}{4}$	1 50	2 40	$1\frac{7}{8}$	4	$2\frac{1}{2}$	$7\frac{1}{8}$	2 75	5 40
	1	$1\frac{3}{4}$	$4\frac{3}{4}$	1 55	2 50	$1\frac{7}{8}$	3	$2\frac{3}{4}$	$7\frac{1}{8}$	2 65	5 20
	2	$1\frac{7}{8}$	5	1 75	2 75	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	2 75	5 60
	1	$1\frac{5}{8}$	$5\frac{1}{8}$	1 80	2 85	$1\frac{7}{8}$	3	$2\frac{3}{4}$	$6\frac{3}{4}$	2 75	5 50
	2	$1\frac{5}{8}$	$6\frac{1}{8}$	1 95	3 45	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	3 00	6 10
	1	$1\frac{5}{8}$	$5\frac{1}{2}$	1 90	3 05	$1\frac{7}{8}$	3	$2\frac{3}{4}$	$6\frac{3}{4}$	2 75	5 65
	2	$1\frac{5}{8}$	$6\frac{1}{8}$	2 00	3 50	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	3 00	6 25
	1	$1\frac{3}{4}$	$5\frac{1}{4}$	2 10	3 40	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	3 25	7 05
	2	$1\frac{3}{4}$	$6\frac{3}{4}$	2 25	3 85	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	3 50	7 80
	1	$1\frac{3}{4}$	$5\frac{1}{4}$	2 10	3 45	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	3 75	8 55
	2	$1\frac{3}{4}$	$6\frac{3}{4}$	2 25	3 85	$1\frac{7}{8}$	4	$2\frac{3}{4}$	$7\frac{1}{8}$	4 00	9 35
	1	$1\frac{3}{4}$	$5\frac{3}{8}$	2 15	3 40						

Standard and Morse tapers are the same.

When ordering, state whether right or left hand mills are wanted.

Discount.....

ANGULAR CUTTERS.



Fig. D. 989.

Left Hand Cutter.

We carry Cutters with the following angles: 45°, 50°, 60°, 70°, 80°, both right and left hand for cutting the teeth of cutters and mills. This style of cutter not adapted for spiral milling.

No. 138 M Carbon Steel.

No. 712 High Speed Steel.

Diameter, Inches.	Thickness, Inches.	Hole, Inches.	Price, Each.	
			Carbon Steel.	High Speed Steel.
2½	1½	1	\$2 65	\$4 10
2¾	1½	1	2 80	4 45
3	1½	1¼	3 35	5 40
3¼	1½	1½	3 75	6 15

Discount.....

ANGULAR CUTTERS.

With Threaded Holes.

No. 138 L Carbon Steel.

No. 713 High Speed Steel.

These cutters have an angle of 60° and are made both right and left hand. In ordering, specify whether right or left hand cutters are desired.

Diameter, Inches.	Thickness, Inches.	Hole, Inches.	Thread.	Price, Each.	
				Carbon Steel.	High Speed Steel.
1½	7/16	3/8	20 L	\$2 25	\$3 15
1¾	9/16	½	16 L	2 50	3 50

Discount.....

ANGULAR CUTTERS AND
CUTTERS
FOR SPIRAL MILLS.

These cutters can be sharpened by grinding without changing their form. They are made of same dimensions as cutters No. 138 J, page 515.

Prices on application.



Fig. D. 990.

Right Hand Cutter.

No. 138 O Carbon Steel.



Fig. D. 991.

Right Hand Cutter.

No. 714 High Speed Steel.

ANGLE CUTTERS.**With One Side Ground Concave.**

We carry cutters of 45°, 50°, 60°, 70°, and 80° angles, both right and left hand.

In ordering specify whether right or left-hand cutters are desired.

No. 138K Carbon Steel.**No. 715 High Speed Steel.**

Fig. D. 992.
Left-hand
Cutter.

Diameter, Inches.	Thickness, Inches.	Hole, Inches.	Price, Each.	
			Carbon Steel.	High Speed Steel.
2½	½	⅞	\$2 65	\$4 10
2¾	¾	1	2 80	4 45
3	¾	1¼	3 35	5 40
3½	¾	1½	3 75	6 15

Discount.....

DOUBLE ANGLE CUTTERS.

We carry cutters with the included angle either 45°, 60° or 90°.

These cutters are suitable for cutting reamers, angles and V grooves.

No. 138N Carbon Steel.**No. 716 High Speed Steel.**

Fig. D. 993.

Diameter, Inches.	Thickness, Inches.	Hole, Inches.	Price, Each.	
			Carbon Steel.	High Speed Steel.
2½	½	⅞	\$2 65	\$4 10
2¾	¾	1	2 80	4 45
3	¾	1¼	3 35	5 40

Discount.....

CUTTERS FOR SPIRAL MILLS.

We carry cutters for cutting spiral mills, either 40°, 48° or 53° angle on one side, and 12° on the other, both right and left hand. In ordering specify whether right or left-hand cutters are desired.

No. 138J Carbon Steel.**No. 717 High Speed Steel.**

Diameter, Inches.	Thickness, Inches.	Hole, Inches.	Price, Each.	
			Carbon Steel.	High Speed Steel.
2½	½	⅞	\$2 65	\$4 10
2¾	¾	1	2 80	4 45
3	¾	1¼	3 35	5 40
3½	¾	1½	3 75	6 15



Fig. D. 994.

Carbon steel cutters will be furnished unless high speed are specified.

Keep Cutters Sharp.

Discount.....

HOLLOW MILLS.



Fig. D. 995.

No. 138 H Carbon Steel.

No. 771 High Speed Steel.

Hole, Inches.	Outside, Inches.	Length, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.
$\frac{3}{16}$	$\frac{3}{8}$	$1\frac{1}{4}$	\$1 00	\$1 50
$\frac{1}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{3}{16}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{1}{4}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{5}{16}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{7}{16}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{1}{2}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{9}{16}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{5}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{3}{4}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{7}{8}$	$\frac{3}{8}$	$1\frac{1}{4}$	1 00	1 50
$\frac{1}{2}$	$\frac{1}{2}$	2	1 50	2 00
$\frac{5}{8}$	$\frac{1}{2}$	2	1 50	2 00
$\frac{3}{4}$	$\frac{1}{2}$	2	1 50	2 00
$\frac{7}{8}$	$\frac{1}{2}$	2	1 50	2 00
1	$\frac{1}{2}$	2	2 00	2 50
	$\frac{3}{4}$	2	2 00	2 50
	$\frac{1}{2}$	$2\frac{1}{4}$	2 00	2 50
	$\frac{3}{4}$	$2\frac{1}{4}$	2 00	3 00
	$\frac{1}{2}$	$2\frac{1}{2}$	2 00	3 00
	$\frac{3}{4}$	$2\frac{1}{2}$	2 00	3 00
	$\frac{1}{2}$	$2\frac{3}{4}$	2 50	3 75
	$\frac{3}{4}$	$2\frac{3}{4}$	2 50	3 75
	$\frac{1}{2}$	$2\frac{1}{2}$	2 50	3 75
	$\frac{3}{4}$	$2\frac{1}{2}$	2 50	3 75
	$\frac{1}{2}$	$2\frac{1}{4}$	2 50	4 75
	$\frac{3}{4}$	$2\frac{1}{4}$	2 50	4 75
	$\frac{1}{2}$	$2\frac{1}{2}$	2 50	4 75
	$\frac{3}{4}$	$2\frac{1}{2}$	2 50	4 75

Carbon steel mills will be furnished unless high speed are specified.

These mills are often used on short cuts, immediately preceding threading dies, but on long, straight cuts, and especially on square stock, and in cutting large-headed screws from a bar, they should be followed by a box tool.

Discount.....

ADJUSTABLE HOLLOW MILLS.



Fig. D. 996.

No. 138-1 Carbon Steel.

No. 772 High Speed Steel.

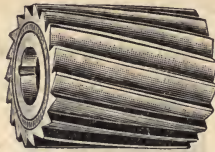
Hole, Inches.	Outside Diameter, Inches.	Length Over All, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.
$\frac{3}{32}$	$\frac{5}{16}$	$1\frac{1}{2}$	\$1 60	\$2 00
$\frac{1}{8}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{9}{32}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{1}{4}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{5}{16}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{3}{8}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{1}{2}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 60	2 00
$\frac{5}{8}$	$\frac{5}{16}$	$1\frac{1}{2}$	1 80	2 50
$\frac{3}{4}$	$\frac{5}{16}$	2	1 80	2 50
$\frac{7}{8}$	$\frac{5}{16}$	2	1 80	2 50
1	$\frac{5}{16}$	2	2 00	3 25
$\frac{1}{8}$	$\frac{3}{8}$	2	2 00	3 25
$\frac{1}{4}$	$\frac{3}{8}$	2	2 00	3 25
$\frac{3}{8}$	$\frac{3}{8}$	2	2 20	3 25
$\frac{1}{2}$	$\frac{3}{8}$	2	2 40	3 75
$\frac{5}{8}$	$\frac{3}{8}$	2	2 60	3 75
$\frac{3}{4}$	$\frac{3}{8}$	2	2 80	4 75
$\frac{7}{8}$	$\frac{3}{8}$	2	3 00	4 75
1	$\frac{3}{8}$	2	3 20	4 75
$\frac{1}{8}$	$\frac{1}{2}$	2	3 40	5 75
$\frac{1}{4}$	$\frac{1}{2}$	2	3 60	5 75
$\frac{3}{8}$	$\frac{1}{2}$	2	3 80	5 75

Carbon steel mills will be furnished unless high speed are specified.

These mills are often used on short cuts, immediately preceding threading dies, but on long, straight cuts, and especially on square stock, and in cutting large-headed screws from a bar, they should be followed by a box tool.

Discount.....

STANDARD MILLING CUTTERS.



No. 139 Carbon Steel.

Fig. D. 997.

No. 700 High Speed Steel.

Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.		Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
2 1/4	1 1/8	1	\$1 30	\$2 05	2 1/4	1 1/8	1	\$2.30	\$4 05
2 1/4	1 1/2	1	1 75	2 85	2 1/4	1 1/4	1	2 50	4 35
2 1/4	1 3/4	1	2 50	4 55	2 1/4	1 3/8	1	2 85	4 95
2 1/4	1 1/2	1	3 30	5 80	2 1/4	1 1/2	1	3 10	5 35
2 1/4	1 3/4	1	1 30	2 10	2 1/4	1 1/8	1	3 25	5 50
2 1/4	1 1/4	1	1 40	2 30	2 1/4	1 1/4	1	3 40	6 10
2 1/4	1 1/2	1	1 50	2 55	2 1/4	1 1/2	1	3 75	6 80
2 1/4	1 3/4	1	1 60	2 65	2 1/4	1 3/4	1	4 00	7 40
2 1/4	1 1/4	1	1 70	2 80	2 1/4	2	1	4 20	7 95
2 1/4	1 1/2	1	1 80	3 00	2 1/4	2 1/2	1	4 60	9 00
2 1/4	1 3/4	1	1 90	3 20	2 1/4	3	1	5 00	10 00
2 1/4	1 1/4	1	2 00	3 45	2 1/4	3 1/2	1	5 50	11 20
2 1/4	1 1/2	1	2 10	3 55	2 1/4	4	1 1/2	6 00	12 65
2 1/4	1 3/4	1	2 20	3 80	2 1/4	5	1 1/2	7 40	15 30
2 1/4	1 1/4	1	2 30	4 00	2 1/4	6	1 1/2	10 00	19 80
2 1/4	1 1/2	1	2 40	4 15	3	1 1/8	1	1 35	2 35
2 1/4	1 3/4	1	2 60	4 55	3	1 1/4	1	1 60	2 75
2 1/4	1 1/4	1	2 75	4 85	3	1 3/8	1	1 85	3 20
2 1/4	1 1/2	1	2 90	5 15	3	1 1/2	1 1/4	2 10	3 55
2 1/4	1 3/4	1	3 10	5 65	3	1 5/8	1 1/4	2 25	3 85
2 1/4	1 1/4	1	3 40	6 30	3	1 7/8	1 1/4	2 40	4 10
2 1/4	1 1/2	1	3 70	6 90	3	2	1 1/4	2 55	4 40
2 1/4	1 3/4	1	3 90	7 35	3	2 1/4	1 1/4	2 70	4 70
2 1/4	1 1/4	1	4 10	7 85	3	2 1/2	1 1/4	2 85	4 95
2 1/4	1 1/2	1	4 25	8 20	3	2 3/4	1 1/4	3 00	5 20
2 1/4	1 3/4	1	4 50	8 80	3	2 5/8	1 1/4	3 30	5 75
2 1/4	1 1/4	1	5 00	9 90	3	2 7/8	1 1/4	3 60	6 35
2 1/4	1 1/2	1	5 50	11 00	3	3	1 1/4	4 00	7 20
2 1/4	1 3/4	1	1 30	2 20	3	3 1/4	1 1/4	4 30	7 85
2 1/4	1 1/4	1	1 50	2 50	3	3 1/2	1 1/4	4 50	8 45
2 1/4	1 1/2	1	1 60	2 70	3	4	1 1/4	4 70	9 00
2 1/4	1 3/4	1	1 80	2 90	3	4 1/4	1 1/4	5 20	10 35
2 1/4	1 1/4	1	1 85	3 20	3	4 1/2	1 1/4	5 40	11 20
2 1/4	1 1/2	1	1 90	3 30	3	4 3/4	1 1/4	5 90	12 50
2 1/4	1 3/4	1	2 00	3 55	3	4 1/2	1 1/4	6 40	13 80
2 1/4	1 1/4	1	2 10	3 90	3	5	1 1/4	7 80	16 90

Cutters of 1/2-inch face and over, are made with spiral teeth.

Carbon steel cutters will be furnished unless high speed are specified.

Discount.....

Continued on page 519.

STANDARD MILLING CUTTERS.

Continued from page 518.

Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.		Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
3	6	1½	\$10 80	\$22 15	4	1½	1½	\$6 65	\$12 70
3	1½	1	1 45	2 65	4	1½	1½	6 65	12 70
3	1¼	1	1 70	3 10	4	1½	1½	7 05	13 70
3	1⅓	1	2 05	3 65	4	1½	1½	7 05	13 70
3	1⅔	1	2 40	4 25	4	2	1½	7 45	14 85
3	1⅞	1	2 75	4 40	4	2	1½	7 45	14 85
3	2	1½	3 15	5 45	4	2½	1½	8 40	17 20
3	2¼	1½	3 30	5 75	4	3	1½	9 00	19 10
3	2½	1½	3 45	6 05	4	3	1½	9 00	19 10
3	2⅞	1½	3 65	6 45	4	3½	1½	10 00	21 55
3	3	1½	3 85	6 80	4	4	1½	11 00	23 95
3	3¼	1½	4 35	7 70	4	4	1½	11 00	23 95
3	3½	1½	4 75	8 25	4	5	1½	13 50	28 95
3	4	1½	5 15	9 10	4	5	1½	13 50	28 95
3	4½	1½	5 60	10 00	4	6	1½	15 50	34 45
3	5	1½	6 00	11 30	4	6	1½	15 50	34 45
3	5½	1½	6 40	12 30	4½	3⅞	1½	3 35	6 20
3	6	1½	6 90	13 80	4½	3⅞	2	3 35	6 20
3	6½	1½	7 40	15 35	4½	4	1½	3 75	6 90
3	7	1½	8 15	16 70	4½	4	2	3 75	6 90
3	7½	1½	9 15	19 30	4½	4½	1½	4 10	7 50
3	8	1½	9 15	22 20	4½	4½	2	4 10	7 50
3	8½	1½	10 40	23 30	4½	5	1½	4 40	8 15
3	9	1½	11 90	26 30	4½	5	2	4 40	8 15
4	1¼	1	2 00	3 80	4½	5½	1½	4 60	8 60
4	1½	1½	2 00	3 80	4½	5½	2	4 60	8 60
4	1⅓	1	2 50	4 55	4½	6	1½	4 60	8 60
4	1⅔	1½	2 50	4 55	4½	6	2	4 85	9 10
4	1⅞	1	3 00	5 35	4½	6½	2	4 85	9 10
4	2	1½	3 00	5 35	4½	7	1½	5 10	9 60
4	2¼	1½	3 50	6 15	4½	7½	2	5 10	9 60
4	2½	1½	3 90	6 85	4½	8	1½	5 50	10 50
4	2⅞	1½	3 90	6 85	4½	8½	2	5 50	10 50
4	3	1½	4 10	7 25	4½	9	1½	6 00	11 55
4	3¼	1½	4 30	7 65	4½	9½	2	6 00	11 55
4	3½	1½	4 50	8 05	4½	10	1½	6 60	13 00
4	3⅞	1½	4 70	8 45	4½	10½	2	6 60	13 00
4	4	1½	4 70	8 45	4½	11	1½	7 25	14 60
4	4½	1½	5 15	9 30	4½	11½	2	7 25	14 60
4	5	1½	5 65	10 25	4½	12	1½	8 00	16 30
4	5½	1½	5 65	10 25	4½	12½	2	8 00	16 30
4	6	1½	6 25	11 60	4½	13	1½	8 75	18 00
4	6½	1½	6 25	11 60	4½	14	2	8 75	18 00

Cutters of ¾-inch face and over, are made with spiral teeth.
Carbon steel cutters will be furnished unless high speed are specified.

Discount.....

METAL SLITTING SAWS.

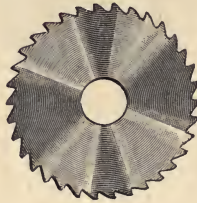


Fig. D. 998.

No. 139 C Carbon Steel.

No. 724 High Speed Steel.

Diameter, Inches.	Thick- ness, Inches.	Hole, Inches.	Price Each.		Diameter, Inches.	Thick- ness, Inches.	Hole, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
2 1/4	3/32	1/8	\$ 1 00	\$ 2 50	4	1/8	1	\$ 1 60	\$ 3 45
2 1/2	3/32	1/8	95	2 40	5	1/8	1	1 80	3 85
2 3/4	1/8	1/8	90	2 35	5	3/32	1	1 50	3 35
3	1/8	1/8	90	2 35	5	1/8	1	1 50	3 35
3 1/4	1/8	1/8	90	2 35	5	1/8	1 1/4	1 50	3 35
3 1/2	3/32	1/8	1 10	2 60	5	1/8	1 1/4	1 50	3 35
3 3/4	3/32	1	1 25	2 95	5	3/32	1	1 90	4 30
4	3/32	1	1 10	2 60	5	1/8	1	2 30	4 30
4 1/4	3/32	1	1 00	2 50	6	1/8	1	4 00	7 50
4 1/2	3/32	1	1 00	2 50	6	3/32	1	3 00	5 85
4 3/4	1/8	1	1 00	2 50	6	1/8	1	2 70	5 35
5	3/32	1	1 15	2 85	6	1/8	1 1/4	3 50	6 45
5 1/4	3/32	1	2 25	4 60	6	1/8	1 1/4	3 50	6 45
5 1/2	3/32	1	1 45	3 15	6	1/8	1	3 50	6 45
5 3/4	1/8	1	1 25	2 95	7	1/8	1	7 50	.....
6	3/32	1	1 20	2 85	7	3/32	1	4 50	8 35
6 1/4	3/32	1	1 20	2 85	7	1/8	1	3 80	7 20
6 1/2	3/32	1	1 40	3 45	8	1/8	1	5 75	12 00

These are thin milling cutters with sides ground slightly concave for clearance. When ordering special saws, mention the kind of work for which they are intended.

Carbon steel cutters will be furnished unless high speed are specified.

Discount.....

SIDE MILLING CUTTERS.

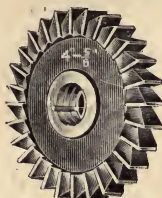


Fig. D. 999.

No. 141 Carbon Steel.

No. 702 High Speed Steel.

Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.		Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price Each.	
			Carbon Steel.	High Speed Steel.				Carbon Steel.	High Speed Steel.
2	$\frac{1}{16}$	$\frac{1}{8}$	\$ 1 85	\$ 3 05	3 $\frac{1}{2}$	$\frac{1}{16}$	1	\$ 4 55	\$ 7 65
2	$\frac{1}{8}$	$\frac{1}{4}$	1 85	3 05	3 $\frac{1}{2}$	$\frac{1}{8}$	1	4 55	7 65
2	$\frac{1}{4}$	$\frac{3}{8}$	2 00	3 25	4	$\frac{1}{2}$	1	5 10	8 55
2	$\frac{1}{4}$	$\frac{1}{2}$	2 00	3 25	4	$\frac{5}{8}$	$\frac{1}{8}$	5 55	9 45
2	$\frac{3}{8}$	$\frac{3}{8}$	2 20	3 55	4	$\frac{5}{8}$	1	5 55	9 45
2	$\frac{3}{8}$	$\frac{1}{2}$	2 20	3 55	4	$\frac{5}{8}$	$1\frac{1}{4}$	5 55	9 45
2	$\frac{1}{2}$	$\frac{1}{2}$	2 20	3 30	4	$\frac{3}{4}$	1	6 00	10 40
2	$\frac{3}{4}$	$\frac{3}{4}$	2 30	3 60	4	$\frac{7}{8}$	1	6 50	11 35
2	$\frac{3}{4}$	$\frac{1}{2}$	2 45	3 70	5	$\frac{3}{4}$	1	6 35	12 45
2	$\frac{1}{2}$	$\frac{1}{4}$	2 55	3 85	5	$\frac{1}{2}$	$1\frac{1}{4}$	6 35	12 45
2	$\frac{1}{2}$	$\frac{1}{4}$	2 65	4 10	5	$\frac{1}{2}$	1	6 90	13 65
2	$\frac{1}{4}$	$\frac{1}{8}$	2 30	3 55	5	1	1	7 80	15 05
2	$\frac{1}{8}$	$\frac{1}{16}$	2 50	3 80	6	$\frac{3}{4}$	1	7 60	15 35
2	$\frac{3}{8}$	$\frac{1}{8}$	2 65	4 00	6	$\frac{1}{2}$	$1\frac{1}{4}$	8 65	18 55
2	$\frac{1}{2}$	$\frac{1}{8}$	2 75	4 35	6	$\frac{1}{2}$	$1\frac{1}{2}$	8 65	18 55
2	$\frac{1}{2}$	$\frac{1}{4}$	2 80	4 45	6	1	1	8 65	18 55
3	$\frac{1}{4}$	1	2 45	3 85	7	1	$1\frac{1}{4}$	16 10	28 95
3	$\frac{1}{8}$	1	2 75	4 35	7	$\frac{1}{8}$	$1\frac{1}{4}$	17 25	31 55
3	$\frac{3}{8}$	1	3 00	4 75	8	1	$1\frac{1}{2}$	19 55	37 30
3	$\frac{1}{2}$	1	3 20	5 10	8	$1\frac{3}{8}$	$1\frac{1}{2}$	23 00	46 65
3	$\frac{1}{2}$	1	3 35	5 40	8	$1\frac{3}{8}$	$1\frac{1}{2}$	23 00	46 65
3	$\frac{1}{2}$	1	3 75	5 75	8	$1\frac{3}{8}$	$1\frac{1}{2}$	23 00	46 65
3 $\frac{1}{2}$	$\frac{1}{2}$	1	4 20	6 95	8	$1\frac{3}{8}$	2	23 00	46 65

Carbon steel cutters will be furnished unless high speed are specified.

These mills having teeth on both sides and face, are suitable for milling the sides of nuts, bolt heads and similar work. Always specify the size of hole wanted.

Discount

SIDE MILLING CUTTERS.

With Inserted Teeth.

No. 141½ Carbon Steel.

No. 705 High Speed Steel.

The bodies of these cutters are machinery steel and the inserted teeth are made of either carbon tool steel or high speed steel. This type of cutter is the most durable and economical for heavy work.

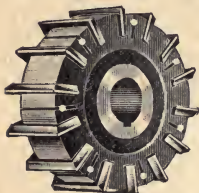


Fig. D. 1000.

Diameter, Inches.	Width of Face, Inches.	Hole, Inches.	Price, Each.	
			With Carbon Steel Blades.	With High Speed Steel Blades.
6	2	1½	\$21 25	\$21 25
7	2	1½	25 00	25 00
8	2	1½	27 50	27 50
9	2	1½	30 00	30 00
10	2	1½	32 50	32 50

Prices on other sizes quoted on application.

Discount.....

FACE MILLING CUTTERS.

With Inserted Teeth.

No. 141½ A Carbon Steel.

No. 707 High Speed Steel.

This form of cutter is especially adapted for face milling. The body is made of machinery steel and has tapered hole with keyway. The cutter is held securely on arbor by screw and key furnished with arbor.

In ordering, state whether right or left-hand cutters are wanted.

The above cutters can be furnished with threaded hole. Prices on application.

When ordering threaded hole cutters, give outside diameter of thread on end of spindle, number of threads per inch, form of thread, and whether thread is right or left hand.

Diameter, Inches.	Face, Inches.	Length of Side Teeth, Inches.	Taper Hole B. & S. Taper No.	Price, Each.	
				With Carbon Steel Blades.	With High Speed Steel Blades.
5½	2½	1 1/8	10	\$15 00	\$15 00
5½	2½	1 1/8	12	15 00	15 00
6½	2½	1 1/8	10	17 50	17 50
6½	2½	1 1/8	12	17 50	17 50
7½	2½	1 1/8	12	20 00	20 00
8½	2½	1 3/8	12	22 50	22 50
9½	2½	1 1/8	12	25 00	25 00

Discount.....



Fig. D. 1001.

ARBORS FOR FACE MILLING CUTTERS.

No. 141½ B.

No.	No. of Taper for Mill.	Length Over All, Inches.	Length of Shank, Inches.	Diameter of Shank, Inches.	Price, Each
1	10	10 1/8	7 1/8	1 1/8	\$ 7 50
2	12	11 1/8	8 1/8	2 1/8	10 00

These arbors have one end blank to be fitted to spindle of machine.

Discount.....

CONVEX AND CONCAVE CUTTERS.

For Milling Half
Circles.

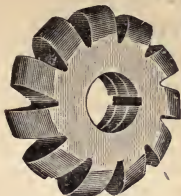


Fig. D. 1002.

Convex.

No. 142 Carbon Steel.
No. 720 High Speed Steel.

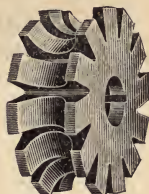


Fig. D. 1003.

Concave.

No. 142 Carbon Steel.
No. 721 High Speed Steel.

Diameter Circle, Inches.	Diameter Cutter, Inches.	Hole, Inches.	Carbon Steel Cutters.		High Speed Cutters.	
			Price Convex Cutter.	Price Concave Cutter.	Price Convex Cutter.	Price Concave Cutter.
$\frac{1}{8}$	2	$\frac{1}{8}$	\$2 00	\$2 40	\$2 85	\$3 50
$\frac{1}{4}$	2	$\frac{1}{4}$	2 25	2 70	2 90	3 95
$\frac{3}{8}$	2	$\frac{3}{8}$	2 50	3 00	3 20	4 40
$\frac{1}{2}$	2	$\frac{1}{2}$	2 80	3 35	4 10	5 00
$\frac{5}{8}$	2	$\frac{5}{8}$	3 10	3 70	4 55	5 55
$\frac{3}{4}$	2	$\frac{3}{4}$	3 35	4 00	4 95	6 00
$\frac{7}{8}$	2	$\frac{7}{8}$	3 60	4 30	5 35	6 50
1	2	1	4 00	4 80	5 95	7 85
$1\frac{1}{8}$	3	$1\frac{1}{8}$	4 40	5 25	7 10	8 75
$1\frac{1}{4}$	3	$1\frac{1}{4}$	4 80	5 75	8 00	10 00
$1\frac{1}{2}$	3	$1\frac{1}{2}$	5 25	6 30	8 80	11 00
$1\frac{3}{4}$	3	$1\frac{3}{4}$	5 75	6 90	9 90	12 50
2	3	2	6 25	7 50	10 80	13 60
$2\frac{1}{4}$	3	$2\frac{1}{4}$	7 00	8 40	12 20	15 70
$2\frac{1}{2}$	3	$2\frac{1}{2}$	7 75	9 30	13 90	17 25

The above cutters can be sharpened without changing their outline.

Keep Cutters Sharp.

Discount.....

INVOLUTE GEAR CUTTERS.

For Teeth of Gear Wheels.



Fig. D. 1004.

No. 147.

All gears of same pitch cut with these cutters will interchange. These cutters can be sharpened by grinding the faces of the teeth, without changing their form.

Each cutter is marked with number, diametral pitch and number of teeth for which it is adapted.

Eight cutters are made for each pitch, as follows:

No. 1 will cut wheels from 135 teeth to a rack.

"	2	"	"	"	55	"	"	134 teeth.
"	3	"	"	"	35	"	"	54 "
"	4	"	"	"	26	"	"	34 "
"	5	"	"	"	21	"	"	25 "
"	6	"	"	"	17	"	"	20 "
"	7	"	"	"	14	"	"	16 "
"	8	"	"	"	12	"	"	13 "

In ordering, give the number of cutter and diametral pitch required. See next page.

INVOLUTE GEAR CUTTERS.
For Teeth of Gear Wheels.



Fig. D. 1005.

No. 147 Carbon Steel.

No. 735 High Speed Steel.

Diametral Pitch.	Diameter of Cutter.		Hole, Inches.	Price Each.		Diametral Pitch.	Diameter of Cutter.		Hole, Inches.	Price Each.	
	Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.
1	8 1/4	8 1/4	2	\$45 00	\$85 00	14	2	2 1/8	1 1/8	2 70	3 75
1 1/4	7 3/4	7 3/4	2	38 00	70 00	15	2	2 3/8	1 1/8	2 60	3 60
1 1/2	7	7	1 1/4	32 00	55 00	16	2	2 1/2	1 1/8	2 50	3 50
1 3/4	6 1/2	6 1/2	1 1/4	24 00	45 00	18	1 1/4	2	1 1/8	2 40	3 40
2	5 5/8	5 5/8	1 1/4	16 00	35 00	20	1 1/4	2	1 1/8	2 30	3 30
2 1/4	5 1/2	5 1/2	1 1/4	13 00	28 00	22	1 1/4	2	1 1/8	2 20	3 20
2 1/2	5 1/4	5 1/4	1 1/4	11 00	23 00	24	1 1/4	1 1/4	1 1/8	2 10	3 10
2 3/4	5 1/8	5 1/8	1 1/4	10 00	20 00	26	1 1/4	1 3/8	1 1/8	2 00	3 00
3	4 7/8	4 7/8	1 1/4	8 00	18 00	28	1 1/4	1 1/2	1 1/8	1 80	3 00
3 1/4	4 3/4	4 3/4	1 1/4	7 00	16 00	30	1 1/4	1 1/4	1 1/8	1 80	3 00
3 1/2	4 3/8	4 3/8	1 1/4	6 75	14 00	32	1 1/4	1 3/4	1 1/8	1 80	3 00
3 3/4	4 1/4	4 1/4	1 1/4	6 50	13 00	34	1 1/4	1 3/8	1 1/8	1 80	3 00
4	4	4	1 1/4	6 00	12 00	36	1 1/4	1 3/4	1 1/8	1 80	3 00
4 1/4	3 3/4	3 3/4	1 1/4	5 50	11 00	38	1 1/4	1 3/8	1 1/8	1 80	3 00
5	3 3/8	3 3/8	1 1/4	5 00	10 00	40	1 1/4	1 3/4	1 1/8	1 80	3 00
5 1/4	3 3/4	3 3/4	1 1/4	5 00	9 00	44	1 1/4	1 1/2	1 1/8	1 80	3 00
6	3	3	1	4 30	8 00	48	1 1/4	1 1/4	1 1/8	1 80	3 00
7	2 7/8	2 7/8	1	4 10	7 00	50	1 1/4	1 3/8	1 1/8	1 80	3 00
8	2 3/4	2 3/4	1	3 90	6 00	56	1 1/4	1 1/2	1 1/8	1 80	3 00
9	2 3/8	2 3/8	1	3 70	5 50	60	1 1/4	1 1/4	1 1/8	1 80	3 00
10	2 1/4	2 1/4	1	3 50	5 00	64	1 1/4	1 3/4	1 1/8	1 80	3 00
11	2 1/8	2 1/8	1	3 30	4 50	70	1 1/4	1 3/8	1 1/8	1 80	3 00
12	2 1/4	2 1/4	1	3 10	4 25	80	1 1/4	1 1/2	1 1/8	1 80	3 00
13	2 1/8	2 1/8	1	2 90	4 00	120	1 1/4	1 1/4	1 1/8	1 80	3 00

Discount.....

INVOLUTE GEAR CUTTERS

With 1-inch Hole.

Keyway 5-32 inch wide, 5-64 inch deep.

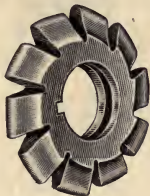


Fig. D. 1006.

No. 147 B Carbon Steel.

No. 736 High Speed Steel.

Diametral Pitch.	Diameter of Cutter.		Price per Cutter.	
	Carbon Steel.	High Speed Steel.	Carbon Steel.	High Speed Steel.
4	3 $\frac{1}{2}$	3 $\frac{1}{2}$	\$5 50	\$12 00
4 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	5 00	11 00
5	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 75	10 00
5 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 50	9 00
6	3	3	4 30	8 00
7	2 $\frac{1}{2}$	2 $\frac{1}{2}$	4 10	7 00
8	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 90	6 00
9	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 70	5 50
10	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 60	5 30
11	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 50	4 95
12	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 35	4 70
13	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 15	4 40
14	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 95	4 15
15	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 85	4 00
16	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 75	3 85
18	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 65	3 75
20	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 55	3 65
22	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 45	3 55
24	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 35	3 45
26	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 25	3 30
28	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
30	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
32	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
34	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
36	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
38	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
40	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
44	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30
48	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 05	3 30

Eight cutters made for each pitch.

Discount.....

INVOLUTE GEAR CUTTERS.

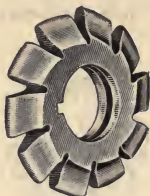
With $1\frac{1}{4}$ -Inch Hole.

Fig. D. 1007.

Keyway $\frac{1}{16}$ -Inch Wide, $\frac{3}{32}$ -Inch Deep.

No. 147 C Carbon Steel.

No. 737 High Speed Steel.

Diametral Pitch.	Diameter of Cutter.		Price per Cutter.	
	Carbon Steel.	High Speed Steel.	Carbon Steel.	High Speed Steel.
3	$4\frac{3}{4}$	$4\frac{3}{4}$	\$8 00	\$18 00
$3\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{5}{8}$	7 00	16 00
$3\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	6 75	14 00
$3\frac{3}{4}$	4	$4\frac{3}{8}$	6 50	13 00
$4\frac{1}{4}$	$3\frac{7}{8}$	$4\frac{1}{4}$	6 00	12 00
$4\frac{1}{2}$	$3\frac{3}{4}$	4	5 50	11 00
5	$3\frac{3}{8}$	$3\frac{3}{4}$	5 00	10 00
$5\frac{1}{2}$	$3\frac{3}{8}$	$3\frac{3}{4}$	5 00	9 00
6	$3\frac{1}{2}$	$3\frac{1}{2}$	4 80	8 40
7	$3\frac{1}{2}$	$3\frac{3}{8}$	4 60	8 00
8	$3\frac{1}{4}$	$3\frac{1}{4}$	4 40	7 30
9	$3\frac{1}{8}$	$3\frac{1}{8}$	4 20	6 65
10	3	3	4 00	6 00
11	$2\frac{7}{8}$	$2\frac{7}{8}$	3 80	5 40
12	$2\frac{7}{8}$	$2\frac{7}{8}$	3 60	5 10
13	$2\frac{7}{8}$	$2\frac{7}{8}$	3 40	4 80
14	$2\frac{7}{8}$	$2\frac{7}{8}$	3 20	4 50
15	$2\frac{7}{8}$	$2\frac{7}{8}$	3 10	4 35
16	$2\frac{7}{8}$	$2\frac{7}{8}$	3 00	4 20
18	$2\frac{3}{4}$	$2\frac{3}{4}$	2 90	4 10
20	$2\frac{3}{4}$	$2\frac{3}{4}$	2 80	4 00

Eight cutters made for each pitch.

Discount.....

INVOLUTE GEAR CUTTERS WITH $1\frac{1}{2}$ INCH HOLE.**Keyway $\frac{1}{16}$ Inch Wide, $\frac{5}{16}$ Inch Deep.****No. 147 D Carbon Steel.****No. 738 High Speed Steel.**

Diametral Pitch.	Diameter of Cutter.		Price per Cutter.	
	Carbon Steel.	High Speed Steel.	Carbon Steel.	High Speed Steel.
2	5 $\frac{1}{2}$	5 $\frac{1}{2}$	\$16 00	\$35 00
2 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	13 00	28 00
2 $\frac{3}{4}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	11 00	23 00
2 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	10 00	20 00
3	5	5 $\frac{1}{2}$	9 00	19 00
3 $\frac{1}{4}$	4 $\frac{1}{2}$	5	8 00	17 80
3 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{7}{8}$	7 50	15 40
3 $\frac{3}{4}$	4 $\frac{1}{2}$	4 $\frac{7}{8}$	7 00	14 30
4	4 $\frac{1}{2}$	4 $\frac{1}{2}$	6 50	13 20
4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{3}{8}$	6 00	12 10
5	4	4 $\frac{1}{2}$	5 50	11 00
5 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	5 50	10 00
6	3 $\frac{1}{2}$	3 $\frac{7}{8}$	5 30	9 00
7	3 $\frac{1}{2}$	3 $\frac{1}{2}$	5 10	8 25
8	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 90	7 50
9	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 70	7 00
10	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 70	6 50

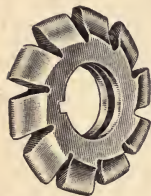


Fig. D. 1008.

Eight cutters made for each pitch.

Discount.....

INVOLUTE GEAR CUTTERS WITH $1\frac{1}{2}$ INCH HOLE.**Keyway $\frac{3}{8}$ Inch Wide, $\frac{1}{8}$ Inch Deep.****No. 147 E Carbon Steel.****No. 739 High Speed Steel.**

Diametral Pitch.	Diameter of Cutter.		Price per Cutter.	
	Carbon Steel.	High Speed Steel.	Carbon Steel.	High Speed Steel.
1 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	\$24 00	\$45 00
2	6 $\frac{1}{2}$	6 $\frac{1}{2}$	17 00	42 00
2 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	13 50	33 60
2 $\frac{3}{4}$	5 $\frac{1}{2}$	6 $\frac{1}{8}$	11 50	26 00
2 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	10 50	23 00
3	5 $\frac{1}{2}$	5 $\frac{1}{2}$	9 50	22 00
3 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	8 50	20 00
3 $\frac{1}{2}$	5	5 $\frac{1}{2}$	7 75	16 80
3 $\frac{3}{4}$	4 $\frac{1}{2}$	5	7 50	15 60
4	4 $\frac{1}{2}$	4 $\frac{3}{4}$	7 00	14 40
4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{3}{8}$	6 50	13 20
5	4 $\frac{1}{2}$	4 $\frac{3}{8}$	6 00	12 00
5 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{3}{8}$	6 00	10 80
6	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 80	10 40
7	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 60	9 10
8	4	4	5 40	7 80

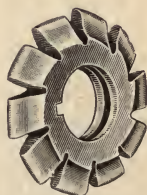


Fig. D. 1009.

Eight cutters made for each pitch.

Discount.....

INVOLUTE GEAR CUTTERS.

Extra Large Diameters with $1\frac{1}{2}$ inch hole.

Keyway 3-8 inch wide, 3-16 inch deep.

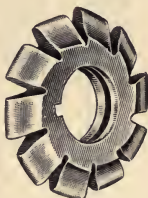


Fig. D. 1010.

No. 147 F Carbon Steel.

No. 740 High Speed Steel.

Diametral Pitch.	Diameter of Cutters.		Price per Cutter.	
	Carbon Steel.	High Speed Steel.	Carbon Steel.	High Speed Steel.
1	$8\frac{1}{2}$	$8\frac{1}{2}$	\$45 00	\$85 00
$1\frac{1}{2}$	$7\frac{1}{2}$	$7\frac{1}{2}$	38 00	70 00
$1\frac{3}{4}$	$7\frac{1}{4}$	$7\frac{1}{4}$	33 00	60 00
$1\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$	25 00	54 00
2	$6\frac{1}{2}$	$6\frac{1}{2}$	16 50	38 50
$2\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$	13 50	30 80
$2\frac{3}{4}$	$6\frac{1}{2}$	$6\frac{1}{2}$	12 00	26 50
$2\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$	10 50	25 00
3	$5\frac{1}{2}$	$5\frac{1}{2}$	9 50	19 80
4	$5\frac{1}{2}$	$5\frac{1}{2}$	8 00	15 85
5	$5\frac{1}{2}$	$5\frac{1}{2}$	7 00	14 20
6	$4\frac{1}{2}$	$4\frac{1}{2}$	5 80	10 40
7	$4\frac{1}{2}$	$4\frac{1}{2}$	5 60	9 10
8	$4\frac{1}{2}$	$4\frac{1}{2}$	5 90	8 60
10	$4\frac{1}{2}$	$4\frac{1}{2}$	5 70	7 80
12	$4\frac{1}{2}$	$4\frac{1}{2}$	4 35	6 65
14	$4\frac{1}{2}$	$4\frac{1}{2}$	4 00	6 00
16	$4\frac{1}{2}$	$4\frac{1}{2}$	4 00	6 00

We can also furnish the above cutters with 2-inch hole when so ordered.
Eight cutters made for each pitch.

CUTTERS FOR MITRE AND BEVEL GEARS.

No. 147 M Carbon Steel.

No. 747 High Speed Steel.

Diametral Pitch.	Diameter of Cutter.		Size of Hole.	Price Per Cutter.		Diametral Pitch.	Diameter of Cutter.		Size of Hole.	Price Per Cutter.	
	Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.		Carbon Steel.	High Speed Steel.
3	4	4	1 1/4	\$7 50	\$15 00	10	2 1/4	2 3/4	1 1/2	\$3 50	\$5 00
4	3 3/4	3 3/4	1 1/4	5 50	12 00	12	2 3/4	2 3/4	1 1/2	3 10	4 25
5	3 1/2	3 3/4	1 1/4	4 75	10 00	14	2	2 1/4	1 1/2	2 70	3 75
6	3	3 3/4	1	4 30	8 00	16	2	2 3/4	1 1/2	2 50	3 50
7	2 7/8	2 3/4	1	4 10	7 00	20	1 7/8	2	1 1/2	2 30	3 30
8	2 3/4	2 3/4	1	3 90	6 00	24	1 3/4	1 1/4	1 1/2	2 10	3 10

Discount

Cutters for pitches not given in the above list will be made to order.

These cutters are thin enough to cut any bevel gear, the tooth face of which is not longer than one-third the distance from its outer end to the point where the shaft center lines meet.

In ordering cutters for bevel gears, if the number of teeth in each gear, the pitch and length of face are given, also the angle of the shafts, if different from a right angle, we can select the proper cutter to send.

When an extra length of face is wanted, requiring an especially thin cutter, this length should be specified in the order.

Eight cutters are made for each pitch and numbered from 1 to 8.

Formula for Selecting Cutters for Mitre and Bevel Gears.

$$\tan. \infty = \frac{Na}{Nb}$$

$$\text{No. of teeth to select cutter for gear} = \frac{Na}{\cos. \infty}$$

$$\text{No. of teeth to select cutter for pinion} = \frac{Nb}{\sin. \infty}$$

Na = No. of Teeth in Gear.
Nb = No. of Teeth in Pinion.
∞ = Center Angle of Gear.

If the gears are mitres or are alike, only one cutter is needed; if one gear is larger than the other, two may be needed.

Keep Cutters Sharp.

MACHINISTS' HAND TAPS.



Taper.



Plug.



Bottoming.

Fig. D. 1011.

No. 131.

All sizes, lengths and threads not listed will be considered special and subject to special prices.

Diameter Standard Size.	Price.		Length Over All, Inches.	No. of Threads to Inch.				
	Each.	Per Set.		United States Standard.	"V" Standard.	Whitworth Standard.	"V" Threads also Furnished.	U. S. Threads also Furnished.
1/4	\$0 45	\$1 35	2 1/2	20	20	20	24, 27, 32	24, 27, 28
5/16	50	1 50	2 3/4	18	18	18	20, 24, 27, 32	20, 24, 27
3/8	55	1 65	2 3/4	16	16	16	14, 18, 20, 24, 27	20, 24, 27
7/16	60	1 80	3 1/4	14	14	14	12, 16, 20, 24, 27	20, 27
1/2	70	2 10	3 3/4	13	12	12	13, 14, 16, 20, 24, 27	12, 20, 27
5/8	80	2 40	3 3/4	12	12	12	14, 27	18, 27
3/4	90	2 70	3 3/4	11	11	11	10, 12, 20, 24, 27	12, 18, 27
7/8	1 05	3 15	4 1/4	11	11	11	10, 12	12, 16
1	1 20	3 60	4 1/4	10	10	10	12, 20, 27	12, 16, 27
1 1/8	1 40	4 20	4 3/4	10	10	10	12	12
1 1/4	1 60	4 80	4 3/4	9	9	9	10, 12, 27	12, 14, 18, 27
1 1/2	1 80	5 40	4 3/4	9	9	9	12	12
1 3/4	2 00	6 00	5 1/8	8	8	8	12, 27	12, 14, 27
1 7/8	2 15	6 45	5 1/8	8	8	....	12	.....
2	2 25	6 75	5 1/8	7	7	7	8, 12	12
2 1/8	2 45	7 35	5 1/8	7	7	....	.....	.....
2 1/4	2 60	7 80	5 3/4	7	7	7	12	.....

List continued on page 531.

Discount.....

MACHINISTS' HAND TAPS.

No. 131.—Continued.

All sizes, lengths and threads not listed will be considered special and subject to special prices.

Diameter. Standard Size.	Price.		Length Over All, Inches.	No. of Threads to Inch.		
	Each.	Per Set.		United States Stand- ard.	"V" Stand- ard.	Whit- worth Stand- ard.
1 $\frac{1}{8}$	\$ 2 80	\$ 8 40	5 $\frac{3}{4}$	7	7	.....
1 $\frac{3}{8}$	3 00	9 00	6 $\frac{1}{8}$	6	6	6
1 $\frac{1}{2}$	3 25	9 75	6 $\frac{1}{4}$	6	6	.....
1 $\frac{5}{8}$	3 50	10 50	6 $\frac{3}{8}$	6	6	6
1 $\frac{3}{4}$	4 20	12 60	6 $\frac{1}{2}$	5 $\frac{1}{2}$	5	5
1 $\frac{7}{8}$	5 00	15 00	7	5	5	5
2	5 80	17 40	7 $\frac{1}{8}$	5	4 $\frac{1}{2}$	4 $\frac{1}{2}$
2 $\frac{1}{8}$	6 70	20 10	7 $\frac{5}{8}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
2 $\frac{1}{4}$	8 00	24 00	8	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
2 $\frac{3}{8}$	9 20	27 60	8 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
2 $\frac{1}{2}$	10 50	31 50	8 $\frac{3}{4}$	4	4 $\frac{1}{2}$	4
2 $\frac{3}{4}$	11 50	34 50	8 $\frac{1}{2}$	4	4	4
2 $\frac{7}{8}$	13 00	39 00	9	4	4	4
2 $\frac{15}{16}$	14 00	42 00	9 $\frac{1}{4}$	4	4	3 $\frac{1}{2}$
3	15 50	46 50	9 $\frac{1}{2}$	3 $\frac{1}{2}$	4	3 $\frac{1}{2}$
3 $\frac{1}{8}$	17 00	51 00	9 $\frac{3}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
3 $\frac{1}{4}$	18 75	56 25	9 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
3 $\frac{3}{8}$	20 50	61 50	10	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{4}$
3 $\frac{1}{2}$	22 00	66 00	10	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$
3 $\frac{5}{8}$	24 00	72 00	10 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$
3 $\frac{3}{4}$	26 00	78 00	10 $\frac{1}{2}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$
3 $\frac{7}{8}$	28 50	85 50	10 $\frac{3}{4}$	3	3	3
4	30 00	90 00	10 $\frac{1}{2}$	3	3	3
	32 50	97 50	10 $\frac{3}{4}$	3	3	3

Unless advised to the contrary, we will fill orders with U. S. Standard threads. Please state number of threads and exact size wanted. Three taps to set—taper, plug and bottoming.

The following machinists' hand taps will be furnished at regular prices.

Right hand—U. S. Standard, Whitworth, and "V" forms, $\frac{1}{16}$ to 4 inches, inclusive.

Left-hand taps are special.

Over sizes: Right Hand—U. S. Standard and "V" forms, $\frac{1}{4}$ inch large, $\frac{1}{8}$ to $\frac{1}{2}$ inch, inclusive; $\frac{3}{4}$ inch large, $\frac{1}{4}$ to 4 inches, inclusive.

Discount.....

MACHINE NUT TAPS.



Fig. D. 1012.

No. 131 A.

All orders will be filled with U. S. Standard Threads, unless otherwise specified.
Left hand Threads are Special.

All sizes, lengths and threads not listed will be considered special and subject to special prices.

Stand- ard Size.	Diameter. Rough Iron, Size.	Price, Each.	Length Over All, Inches.	No. of Threads to Inch.				
				United States Stand- ard.	"V" Stand- ard.	Whit- worth Stand- ard.	"V" Threads also Furnished.	U. S. Threads also Furnished.
$\frac{1}{16}$	$\frac{13}{64}$	\$0 60	$4\frac{1}{2}$	30	24	24	32	24, 32
	$\frac{7}{32}$	60	$4\frac{1}{2}$	32	24			
		60	$4\frac{1}{2}$	28	24	24		
$\frac{1}{4}$	$\frac{11}{64}$	60	5	20	20	20	24	24, 28
	$\frac{9}{32}$	60	5	20	20			
		60	5	20	20			
$\frac{5}{16}$	$\frac{21}{64}$	70	$5\frac{1}{2}$	18	18	18	16, 20, 24	20, 24
	$\frac{5}{16}$	70	$5\frac{1}{2}$	18	18			
	$\frac{1}{2}$	70	$5\frac{1}{2}$	18	18			
$\frac{3}{8}$	$\frac{25}{64}$	80	6	16	16	16	14, 18	20, 24
	$\frac{3}{8}$	80	6	16	16			
		80	6	16	16			
$\frac{7}{16}$	$\frac{29}{64}$	90	$6\frac{1}{2}$	14	14	14	12, 16	20
	$\frac{7}{16}$	90	$6\frac{1}{2}$	14	14			
		90	$6\frac{1}{2}$	14	14			
$\frac{1}{2}$	$\frac{33}{64}$	1 00	7	13	12	12	13	12, 20
	$\frac{1}{2}$	1 00	7	13	12			
		1 00	7	13	12			
$\frac{9}{16}$	$\frac{37}{64}$	1 15	$7\frac{1}{2}$	12	12	12	14	18
	$\frac{9}{16}$	1 15	$7\frac{1}{2}$	12	12			
		1 15	$7\frac{1}{2}$	12	12			
$\frac{5}{8}$	$\frac{41}{64}$	1 30	8	11	11	11	10, 12	18
	$\frac{5}{8}$	1 30	8	11	11			
		1 30	8	11	11			
$\frac{11}{16}$	$\frac{45}{64}$	1 45	$8\frac{1}{2}$	11	11	11	12	16
	$\frac{11}{16}$	1 45	$8\frac{1}{2}$	11	11			
$\frac{3}{4}$	$\frac{49}{64}$	1 60	9	10	10	10	12	16
	$\frac{3}{4}$	1 60	9	10	10			
		1 60	9	10	10			
$\frac{13}{16}$	$\frac{53}{64}$	1 80	$9\frac{1}{2}$	10	10	10	12	
	$\frac{13}{16}$	1 80	$9\frac{1}{2}$	10	10			
$\frac{7}{8}$	$\frac{57}{64}$	2 10	10	9	9	9	10, 12	14
	$\frac{7}{8}$	2 10	10	9	9			
		2 40	$10\frac{1}{2}$	9	9	9	12	
$1\frac{1}{16}$	$\frac{61}{64}$	2 40	$10\frac{1}{2}$	9	9			
1	$1\frac{1}{8}$	3 15	11	8	8	8	12	14
		3 15	11	8	8			
$1\frac{1}{8}$	$1\frac{1}{4}$	3 40	11	8	8			
		3 60	$11\frac{1}{2}$	7	7	7	8	
$1\frac{1}{2}$	$1\frac{3}{4}$	3 60	$11\frac{1}{2}$	7	7			

Discount.....

List continued on next page.

MACHINE NUT TAPS.

No. 131 A—Continued.

Diameter.		Price, Each.	Length Over All, Inches.	No. of Threads to Inch.		
Standard Size.	Rough Iron, Size.			United States Standard.	"V" Standard	Whit- worth Standard.
1 $\frac{1}{16}$		\$3 90	11 $\frac{1}{2}$	7	7	
1 $\frac{1}{8}$		4 25	12	7	7	7
	1 $\frac{3}{16}$	4 25	12	7	7	
1 $\frac{1}{4}$		4 50	12	7	7	
1 $\frac{3}{8}$		4 80	12 $\frac{1}{2}$	6	6	6
	1 $\frac{1}{2}$	4 80	12 $\frac{1}{2}$	6	6	
1 $\frac{1}{2}$		5 00	12 $\frac{1}{2}$	6	6	
1 $\frac{3}{4}$		5 65	13	6	6	6
	1 $\frac{7}{8}$	5 65	13	6	6	
1 $\frac{5}{8}$		6 50	13 $\frac{1}{2}$	5 $\frac{1}{2}$	5	5
	1 $\frac{3}{4}$	6 50	13 $\frac{1}{2}$	5 $\frac{1}{2}$	5	
1 $\frac{3}{4}$		7 20	14	5	5	5
	1 $\frac{3}{4}$	7 20	14	5	5	
1 $\frac{7}{8}$		8 25	14 $\frac{1}{2}$	5	4 $\frac{1}{2}$	4 $\frac{1}{2}$
	1 $\frac{3}{4}$	8 25	14 $\frac{1}{2}$	5	4 $\frac{1}{2}$	
2		9 25	15	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
	2 $\frac{1}{8}$	9 25	15	4 $\frac{1}{2}$	4 $\frac{1}{2}$	
2 $\frac{1}{8}$		10 80	15 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
	2 $\frac{1}{8}$	10 80	15 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	
2 $\frac{1}{4}$		12 25	16	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4
	2 $\frac{3}{16}$	12 25	16	4 $\frac{1}{2}$	4 $\frac{1}{2}$	
2 $\frac{3}{8}$		13 80	16 $\frac{1}{2}$	4	4 $\frac{1}{2}$	4
	2 $\frac{1}{2}$	13 80	16 $\frac{1}{2}$	4	4 $\frac{1}{2}$	
2 $\frac{1}{2}$		15 00	17	4	4	4
	2 $\frac{1}{2}$	15 00	17	4	4	
2 $\frac{5}{8}$		16 00	17 $\frac{1}{2}$	4	4	4
	2 $\frac{3}{4}$	16 00	17 $\frac{1}{2}$	4	4	
2 $\frac{3}{4}$		18 00	18	4	4	3 $\frac{1}{2}$
	2 $\frac{3}{4}$	18 00	18	4	4	
2 $\frac{7}{8}$		19 80	18 $\frac{1}{2}$	3 $\frac{1}{2}$	4	3 $\frac{1}{2}$
	2 $\frac{3}{4}$	19 80	18 $\frac{1}{2}$	3 $\frac{1}{2}$	4	
3		21 60	19	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	3 $\frac{1}{8}$	21 60	19	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{1}{8}$		24 70	19 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	5 $\frac{1}{16}$	24 70	19 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{1}{4}$		26 88	19 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	3 $\frac{1}{8}$	26 88	19 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{3}{8}$		28 75	20	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	3 $\frac{1}{4}$	28 75	20	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{1}{2}$		31 25	20	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	3 $\frac{1}{4}$	31 25	20	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{5}{8}$		33 78	20 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$
	3 $\frac{1}{2}$	33 78	20 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
3 $\frac{3}{4}$		36 88	20 $\frac{1}{2}$	3	3	3
	3 $\frac{3}{4}$	36 88	20 $\frac{1}{2}$	3	3	
3 $\frac{7}{8}$		38 75	21	3	3	3
	3 $\frac{3}{4}$	38 75	21	3	3	
4		41 88	21	3	3	3

Discount.....

TAPS FOR MACHINE SCREWS.



Fig. D. 1013. No. 132 A.

Less than six of a size and thread will be charged at rate of single Taps.
 These Taps furnished in sets of taper, plug and bottoming, when desired.
 Left-hand Machine Screw Taps are special.

Size of Screw Gauge.	Price.		Standard No. of Threads.	Threads Also Furnished.
	Each.	Per Dozen.		
No. 1	\$0 35	\$4 00		56, 60, 64, 72
1½	35	4 00		56
2	35	4 00	56	48, 64
3	35	4 00	48	40, 56
4	35	4 00	36	32, 40, 42, 48
5	35	4 00	36	32, 40
6	35	4 00	32	30, 36, 38, 40, 48
7	35	4 00	32	30, 40
8	35	4 00	32	30, 36, 40
9	35	4 00	30	28, 32
10	35	4 00	24	28, 30, 32, 36
11	35	4 00	24	28, 30
12	35	4 00	24	20, 32
13	38	4 40	22	20, 24, 32
14	38	4 40	20	18, 24
15	38	4 40	20	18, 24
16	38	4 40	18	16, 20
18	38	4 40	18	16, 20
20	45	5 30	16	18
22	45	5 30	16	18
24	45	5 30	16	14, 18
26	53	6 30	16	14
28	53	6 30	14	16
30	53	6 30	14	16

No. 132 B. A. S. M. E. Standard.

Size of Screw Gauge.	Price.		Standard No. of Threads.	Threads also Furnished.
	Each.	Per Dozen.		
0	\$0 35	\$4 00	80	
1	35	4 00	72	64
2	35	4 00	64	56
3	35	4 00	56	48
4	35	4 00	48	36, 40
5	35	4 00	44	36, 40
6	35	4 00	40	32, 36
7	35	4 00	36	30, 32
8	35	4 00	36	30, 32
9	35	4 00	32	24, 30
10	35	4 00	30	24, 32
12	35	4 00	28	24
14	38	4 40	24	20
16	38	4 40	22	20
18	38	4 40	20	18
20	45	5 30	20	18
22	45	5 30	18	16
24	45	5 30	16	18
26	53	6 30	16	14
28	53	6 30	14	16
30	53	6 30	14	16

Discount.....

STAY BOLT TAPS.



Fig. D. 1014. No. 133 D.

In ordering stay bolt taps, state diameter and number of threads to the inch; also length and dimensions of parts as indicated in cut by letters A, B, C, D, E.

All stay bolt taps will be furnished with 12 V threads to the inch, unless a different thread is specified.

Stay bolt taps with 12 threads to the inch, Whitworth Standard form furnished at regular list and discount.

Diameter given is that of the thread at its straight part.

Prices are for each inch of length 16 inches and upwards.

Taps shorter than 16 inches will be charged as if 16 inches long.

Stay bolt taps 20 and 24 inches long in sizes from $\frac{3}{8}$ to $1\frac{1}{2}$ inches diameter, 12 V threads to the inch, carried in stock in the following proportions:

Total Length.	A	B	C	D	E
20 in.	1 in.	6 in.	$1\frac{1}{2}$ in.	6 in.	$5\frac{1}{2}$ in.
24 "	1 "	8 "	2 "	6 "	7 "

Diameter, Inches.	Price, per Inch.	Diameter, Inches.	Price, per Inch.
$\frac{3}{8}$ to $\frac{7}{8}$, inclusive	\$0 40	$1\frac{3}{8}$ to $1\frac{1}{4}$, inclusive	\$0 55
$\frac{1}{2}$ to 1, "	45	$1\frac{1}{8}$ to $1\frac{3}{8}$, "	60
$1\frac{1}{8}$ to $1\frac{1}{2}$, "	50	$1\frac{1}{4}$ to $1\frac{1}{2}$, "	70

Discount.....

SPINDLE STAY BOLT TAPS.



Fig. D. 1015. No. 133 E.

Used for retapping stay bolt holes from the inside of fire box of locomotives.

These taps will be furnished with form of thread, 12 to the inch, as desired.

Other sizes than those named below will be furnished to order at special prices.

Diam. of Tap, Inches.	Price, Each.	Length Over All, Inches.	Length of Fluted Thread, Inches.	Length of Unfluted Thread, Inches.	Diameter of Spindle, Inches.	Length of Spindle, Inches.
$\frac{3}{8}$	\$ 8 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$\frac{1}{2}$	8 50	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
$\frac{7}{8}$	9 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$1\frac{1}{8}$	9 50	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
1	10 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$1\frac{1}{8}$	10 50	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
$1\frac{1}{4}$	11 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$1\frac{3}{8}$	11 50	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
$1\frac{1}{2}$	12 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$1\frac{5}{8}$	12 25	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
$1\frac{3}{4}$	12 50	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11
$1\frac{7}{8}$	12 75	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{5}{8}$	11
$1\frac{1}{2}$	13 00	$7\frac{5}{8}$	$3\frac{1}{4}$	$2\frac{3}{4}$	$\frac{3}{8}$	11

Discount.....

TAPPER TAPS.



Fig. D. 1016.
No. 133 C.

All orders will be filled with U. S. Standard threads unless otherwise specified.

All sizes, lengths and threads not listed will be considered special and subject to special prices.

Tapper taps with left-hand threads are special.

Diameter.		Length Over All, Price Each.				Length Thread, Inches.	No. Threads to Inch.		
Standard Size.	Rough Iron, Size.	11 Inches.	12 Inches.	14 Inches.	15 Inches.		U. S. Standard	"V" Standard	Whit- worth Standard.
1/4	.....	\$0 70	\$0 75	\$0 80	\$0 90	1 1/4	20	20	20
.....	1 1/4	70	75	80	90	1 1/4	20	20	.....
.....	1 1/4	70	75	80	90	1 1/4	20	20	.....
5/16	.....	80	85	90	1 00	2	18	18	18
.....	5/16	80	85	90	1 00	2	18	18	.....
.....	5/16	80	85	90	1 00	2	18	18	.....
3/8	.....	90	95	1 00	1 10	2	16	16	16
.....	3/8	90	95	1 00	1 10	2	16	16	.....
.....	3/8	90	95	1 00	1 10	2	16	16	.....
7/16	.....	1 00	1 05	1 15	1 25	2 1/4	14	14	14
.....	7/16	1 00	1 05	1 15	1 25	2 1/4	14	14	.....
.....	7/16	1 00	1 05	1 15	1 25	2 1/4	14	14	.....
1/2	.....	1 12	1 15	1 25	1 35	2 1/4	*13	*12	12
.....	1/2	1 12	1 15	1 25	1 35	2 1/4	*13	*12	.....
.....	1/2	1 12	1 15	1 25	1 35	2 1/4	*13	*12	.....
5/8	.....	1 30	1 35	1 45	1 55	2 3/4	12	12	12
.....	5/8	1 30	1 35	1 45	1 55	2 3/4	12	12	.....
.....	5/8	1 30	1 35	1 45	1 55	2 3/4	12	12	.....

List continued on next page.

Discount.....

TAPPER TAPS.

No. 133 C.

Diameter.		Length Over All, Price, Each.				Length Thread, Inches.	No. Threads to Inch.		
Standard Size.	Rough Iron Size.	11 Inches.	12 Inches.	14 Inches.	15 Inches.		U. S. Stand- ard.	"V" Stand- ard.	Whit- worth Stand- ard.
$\frac{5}{8}$		\$1 45	\$1 50	\$1 65	\$1 75	2 $\frac{1}{2}$	11	11	11
	$\frac{11}{16}$	1 45	1 50	1 65	1 75	2 $\frac{1}{2}$	11	11	
	$\frac{3}{4}$	1 45	1 50	1 65	1 75	2 $\frac{1}{2}$	11	11	
$\frac{11}{16}$		1 62	1 70	1 80	1 95	2 $\frac{1}{2}$	11	11	11
	$\frac{3}{4}$	1 62	1 70	1 80	1 95	2 $\frac{1}{2}$	11	11	
$\frac{3}{4}$		1 80	1 85	2 00	2 10	2 $\frac{1}{2}$	10	10	10
	$\frac{3}{4}$	1 80	1 85	2 00	2 10	2 $\frac{1}{2}$	10	10	
$\frac{13}{16}$		2 05	2 10	2 25	2 35	2 $\frac{1}{2}$	10	10	10
	$\frac{7}{8}$	2 05	2 10	2 25	2 35	2 $\frac{1}{2}$	10	10	
$\frac{7}{8}$		2 35	2 45	2 60	2 75	3	9	9	9
	$\frac{7}{8}$	2 35	2 45	2 60	2 75	3	9	9	
$\frac{15}{16}$		2 70	2 75	3 00	3 15	3	9	9	9
	$\frac{7}{8}$	2 70	2 75	3 00	3 15	3	9	9	
1		3 15	3 20	3 50	3 65	3 $\frac{1}{2}$	8	8	8
	1 $\frac{1}{16}$	3 15	3 20	3 50	3 65	3 $\frac{1}{2}$	8	8	
1 $\frac{1}{8}$		3 60	3 70	3 95	4 10	3 $\frac{1}{2}$	7	7	7
	1 $\frac{1}{8}$	3 60	3 70	3 95	4 10	3 $\frac{1}{2}$	7	7	
1 $\frac{1}{4}$		4 15	4 25	4 50	4 65	3 $\frac{1}{2}$	7	7	7
	1 $\frac{1}{4}$	4 15	4 25	4 50	4 65	3 $\frac{1}{2}$	7	7	
1 $\frac{3}{8}$		4 70	4 80	5 05	5 20	4	6	6	6
	1 $\frac{3}{8}$	4 70	4 80	5 05	5 20	4	6	6	
1 $\frac{1}{2}$		5 30	5 40	5 65	5 80	4	6	6	6
	1 $\frac{1}{2}$	5 30	5 40	5 65	5 80	4	6	6	

Discount.....

BOILER TAPS.



Fig. D. 1017.

No. 133 F.

* Taper.



Fig. D. 1018.

No. 133 1/2 F.

** Straight.

Orders will be filled with U. S. or V Threads, as desired.

Diameter, Inches.	Price, Each.	Length Over All, Inches.	Diameter, Inches.	Price, Each.	Length Over All, Inches.
1/2	\$1 00	3 1/4	1 5/8	\$4 00	6 1/2
5/8	1 15	4	1 3/4	4 30	6 1/2
3/4	1 30	4 1/4	1 7/8	4 60	6 1/2
7/8	1 45	4 1/2	2	4 90	6 1/2
1	1 60	4 3/4	2 1/8	5 10	7
1 1/8	1 80	5 1/4	2 1/4	5 40	7 1/2
1 1/4	2 10	5 1/2	2 3/8	5 70	7 1/2
1 1/2	2 40	5 3/4	2 1/2	6 00	7 1/2
1 3/4	2 80	6	2 3/4	6 50	8
2	3 00	6 1/4	2 7/8	7 00	8 1/4
2 1/8	3 20	6 1/2	3	7 50	8 1/4
2 1/4	3 40	6 3/4	3 1/8	7 50	8 1/4
2 3/8	3 70	6 3/4	3 1/4	8 00	8 1/2

Discount.....

Taps will be furnished, if desired, 3/2-inch over size up to 1 1/4 inches, at regular prices.

*These taps are slightly tapered to make a steam tight fit. Diameter given is size of tap about 1/8-inch from large end of thread.

**The full thread of above taps is straight. The reamer at point is used to size the hole, and serves as a gauge for size of drill to be used before tapping.

Left hand taps are special.

ADJUSTABLE TAP AND REAMER WRENCHES.



Fig. D. 1019.

Size	Capacity (Tap Sizes).		Full Length, Inches.	Price Each.	Size	Capacity (Tap Sizes).		Full Length, Inches.	Price Each.
	Hand.	Pipe.				Hand.	Pipe.		
00	3/8 and smaller		5	\$ 1 25	7 1/2	3/8-1 1/4	1/4-3/4	30	\$ 6 50
0	1/8-1/4		7	1 50	8	3/4-1 1/2	1/4-1 1/4	42	8 00
4	1/8-3/8		9	1 75	20	1/2-1 1/2	1/4-1	42	7 00
5	3/8-1/2		11	2 00	22	1 1/8-2 5/8	1-2	56	15 00
6	1/4-3/4	1/8-3/8	15	2 50	24	1 3/4 over	2-4	72	25 00
7	3/8-1	1/8-3/4	20	3 50					

Discount.....

MASTER TAPS FOR CUTTING SOLID DIES.



Fig. D. 1020. No. 133—I.

Diameter.	Price, Each.	Length Over All, Inches.	No. of Threads to Inch.			
			United States Standard.	"V" Standard	Whit- worth Standard	"V" Threads also Furnished
$\frac{1}{4}$	\$0 75	3 $\frac{1}{2}$	20	20	20	
$\frac{5}{16}$	87	4	18	18	18	
$\frac{3}{8}$	1 00	4 $\frac{1}{2}$	16	16	16	14
$\frac{7}{16}$	1 12	5	14	14	14	16
$\frac{1}{2}$	1 25	5 $\frac{1}{2}$	13	12	12	13, 14
$\frac{5}{8}$	1 44	6	12	12	12	
$\frac{3}{4}$	1 62	6 $\frac{1}{2}$	11	11	11	10, 12
$\frac{7}{8}$	1 81	7	11	11	11	12
1	2 00	7 $\frac{1}{2}$	10	10	10	
$1\frac{1}{8}$	2 25	8	10	10	10	
$1\frac{1}{4}$	2 62	8 $\frac{1}{2}$	9	9	9	
$1\frac{3}{8}$	3 00	8 $\frac{3}{4}$	9	9	9	
$1\frac{1}{2}$	3 50	9	8	8	8	
$1\frac{3}{4}$	4 00	9 $\frac{1}{2}$	7	7	7	8
2	4 62	9 $\frac{3}{4}$	7	7	7	
$2\frac{1}{8}$	5 25	9 $\frac{1}{2}$	6	6	6	
$2\frac{1}{4}$	5 87	10	6	6	6	
$2\frac{3}{8}$	6 62	10 $\frac{1}{2}$	5 $\frac{1}{2}$	5	5	
$2\frac{1}{2}$	7 50	10 $\frac{3}{4}$	5	5	5	
$2\frac{3}{4}$	8 50	10 $\frac{1}{2}$	5	4 $\frac{1}{2}$	4 $\frac{1}{2}$	
3	9 62	11	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	

These "Long Hob Taps" are mostly used for cutting Solid Bolt Dies.

Orders will be filled with U. S. or V Standard Threads as desired.

Rough Iron Sizes in "V" Standard, United States Standard and Whitworth Threads at regular list and discount.

Discount.....

SHORT PATCH BOLT TAPS.



Diam., Inches.	Price, Each.	Length, Over All, Inches.	No. of Threads to Inch.	Diam., Inches.	Price, Each.	Length, Over All, Inches.	No. of Threads to Inch.
$\frac{1}{2}$	\$0 70	3	12	$\frac{1}{2}$	\$1 80	3	12
$\frac{5}{8}$	80	3	12	1	2 00	3	12
$\frac{3}{4}$	90	3	12	$1\frac{1}{8}$	2 15	3	12
$\frac{7}{8}$	1 05	3	12	$1\frac{1}{4}$	2 25	3	12
1	1 20	3	12	$1\frac{3}{8}$	2 45	3	12
$1\frac{1}{8}$	1 40	3	12	$1\frac{1}{2}$	2 60	3	12
$1\frac{1}{4}$	1 60	3	12				

These Taps are slightly tapered to make the bolt a *steam tight fit*.

Diameter given is size of Tap at about $\frac{1}{8}$ -inch from large end of thread.

U. S. or V threads furnished as desired.

Rough Iron Sizes furnished at regular prices.

Discount.....

Fig. D. 1021.
No. 133 $\frac{1}{2}$ F.

MASTER TAPS FOR CUTTING OPEN DIES.



Fig. D. 1022.

No. 133 J. Code, Argus.

All orders will be filled with U. S. or "V" Standard threads, as desired.

Rough iron sizes of standard pitches, "V" Standard threads and U. S. standard form, furnished at regular prices.

All sizes, lengths and threads not listed will be considered special and subject to special prices.

Hob or master taps with left hand threads are special.

Diameter, Inches.	Price, Each.	Length Over All, Inches.	No. of Threads to Inch.			
			United States Standard.	"V" Standard	Whitworth Standard	"V" Threads also Furnished.
$\frac{1}{4}$	\$0 60	$2\frac{1}{2}$	20	20	20	
$\frac{5}{16}$	80	$2\frac{3}{4}$	18	18	18	
$\frac{3}{8}$	80	$2\frac{1}{2}$	16	16	16	14
$\frac{7}{16}$	90	$3\frac{1}{8}$	14	14	14	16
$\frac{1}{2}$	1 00	$3\frac{3}{8}$	13	12	12	13, 14
$\frac{5}{8}$	1 15	$3\frac{1}{2}$	12	12	12	
$\frac{3}{4}$	1 30	$3\frac{3}{4}$	11	11	11	10, 12
$\frac{7}{8}$	1 45	$4\frac{1}{8}$	11	11	11	12
$\frac{1}{2}$	1 60	$4\frac{1}{4}$	10	10	10	
$\frac{3}{4}$	1 80	$4\frac{3}{4}$	10	10	10	
$\frac{7}{8}$	2 10	$4\frac{1}{2}$	9	9	9	
$\frac{1}{2}$	2 40	$4\frac{3}{4}$	9	9	9	
1	2 80	$5\frac{1}{8}$	8	8	8	
$1\frac{1}{8}$	3 20	$5\frac{1}{4}$	7	7	7	8
$1\frac{1}{4}$	3 70	$5\frac{3}{4}$	7	7	7	
$1\frac{1}{2}$	4 20	$6\frac{1}{4}$	6	6	6	
$1\frac{3}{4}$	4 70	$6\frac{3}{8}$	6	6	6	
$1\frac{7}{8}$	5 30	$6\frac{1}{2}$	$5\frac{1}{2}$	5	5	
$1\frac{1}{2}$	6 00	7	5	5	5	
$1\frac{1}{4}$	6 80	$7\frac{1}{8}$	5	$4\frac{1}{2}$	$4\frac{1}{2}$	
2	7 70	$7\frac{3}{8}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	

This tap is intended for cutting both open and screw plate dies, but solid dies may be cut, if a leading tap of a diameter large enough to let the point of tap enter, is passed through the die first, as the tap is chased slightly smaller on point, so that it will enter after smaller tap.

In ordering, state for which they are wanted, as they are made larger for screw plate dies.

Discount.....

MACHINE OR SOLID BOLT DIES.



Fig. D. 1023.

Cutting Sizes.	Price, Each.	No. of Threads to Inch.				Outside Dimensions	
		"V" Standard	United States Standard	Whit- worth Standard	"V" Threads also Fur- nished.	Size, Square Inches.	Thick- ness, Inches.
$\frac{1}{4}$	\$1 80	20	20	20		$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{5}{16}$	1 80	18	18	18	16	$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{3}{8}$	1 80	16	16	16	14	$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{7}{16}$	1 80	14	14	14	12	$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	1 80	12	13	12	13	$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{5}{8}$	1 90	12	12	12		$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{3}{4}$	2 00	11	11	11	10, 12	$2\frac{1}{2}$	$\frac{1}{2}$
$\frac{7}{8}$	2 10	11	11	11		$2\frac{1}{2}$	$\frac{1}{2}$
$1\frac{1}{8}$	2 20	10	10	10	12	$2\frac{1}{2}$	$\frac{1}{2}$
$1\frac{1}{4}$	2 30	10	10	10		$2\frac{1}{2}$	$\frac{1}{2}$
$1\frac{3}{8}$	2 40	9	9	9	10, 12	$2\frac{1}{2}$	$\frac{1}{2}$
$1\frac{1}{2}$	2 55	9	9	9	12	$2\frac{1}{2}$	$\frac{1}{2}$
1	2 70	8	8	8	12	$2\frac{1}{2}$	1
$1\frac{1}{8}$	3 00	7	7	7	12	$2\frac{1}{2}$	1
$1\frac{1}{4}$	3 30	7	7	7	12	$2\frac{1}{2}$	1
$1\frac{3}{8}$	3 60	6	6	6		$2\frac{1}{2}$	1
$1\frac{1}{2}$	3 90	6	6	6		3	1
$1\frac{3}{4}$	4 20	5	5	5		3	1
$1\frac{7}{8}$	5 40	5	5	5		3	$1\frac{1}{4}$
$1\frac{1}{2}$	6 50	$4\frac{1}{2}$	5	$4\frac{1}{2}$		$3\frac{1}{2}$	$1\frac{1}{2}$
2	7 50	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$		$3\frac{1}{2}$	2

Discount.....

Rough Iron Sizes "V" Standard and United States Standard Threads
furnished at regular prices.

PATENT DEVICES FOR TAPPING STAY-BOLT HOLES

Which are Behind the Frames, Drivers, or other Parts of
Locomotive Engines.

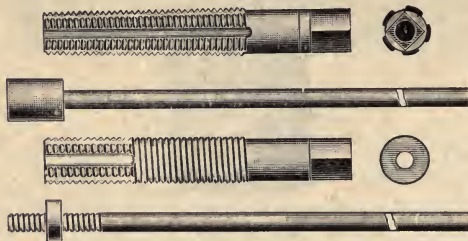


Fig. D. 1024.

Directions for Using.

The object of these devices is to replace broken or worn out stay-bolts with new ones without removing the frames, drivers, or otherwise disturbing the engine.

And this is accomplished by first removing the old stay-bolt, and then rethreading the stay-bolt holes from the inside of the fire-box, and by then inserting the new stay-bolt, also from the inside of the fire-box, which may be done quickly and effectively at comparatively little expense, and without injury to the engine, or keeping it out of service, and may be practiced as follows:

From the inside of the fire-box put the spindle having the enlarged end into the holes to be threaded, placing the enlargement in the hole of the outer shell. Then put the taper tap on the spindle and thread the hole in the fire-box sheet. It will thus be seen that as the enlarged end of the spindle fits the hole in the outer sheet, and the tap fits the hole in the inner sheet, which it will easily enter, being taper, that it will necessarily be guided in a right or straight line, and is forced to cut a thread exactly corresponding as to pitch and coincident to the opposite hole in the outer sheet. When the hole in the fire-box-sheet is threaded, then remove the tap and spindle and put in the spindle having the threaded end and round nut, placing the nut in the hole of the outer sheet, half in and half out. This affords a firm bearing for the spindle, and will necessarily guide the plug tap in a straight line, while at the same time allowing it to enter and cut its thread in the hole of the outer sheet until the end touches the round nut when by pulling back on the spindle and turning it the nut will be unscrewed and will drop down on the outside of the fire-box. Now the plug tap having a firm bearing and in a right or straight line with the holes of both the inner and outer shells of the fire-box, is free to finish threading the hole in the outer sheet.

Price.....per set, \$35 00

RADIAL DEVICES.

Especially Adapted for Tapping Stay-Bolt Holes at Long Distances.



Fig. D. 1025.

These Radial devices are especially adapted for long distances—as from the outer shell to the crown sheet, or from side to side of shell, and are made to suit any required size, as $1\frac{1}{2}$ inches in shell plate, to one-inch in crown sheet—and by the employment of which the operation of tapping under conditions involving long distance, is more rapidly, economically and perfectly accomplished.

In the manufacture and use of these devices it will be noted, that the Taps are made in various sizes, while the spindle may be of uniform size, thus enabling taps of any size to be used and operated upon the same size spindle. The length of the spindle may be regulated by the longest distance between the sheets.

In operation, they are adapted to be used by two men at the same time, being capable of simultaneous operation upon the bolt-holes in both sheets—as follows: Screw one tap on the spindle far enough to have a firm bearing, then pass the spindle into the holes to be threaded, until the end of the tap enters the adjoining sheet, and the other end of the spindle extends or projects far enough from the hole in the other sheet to receive the other tap. The other tap is then screwed upon this projecting end of the spindle, and the two taps are both run into the sheets and the bolt-holes are threaded.

By reason of this superior construction and arrangement of internally and externally threaded taps, mounted at opposite ends of a screw threaded spindle, having its threads of the same pitch as those of the taps, it will be apparent that the taps are relatively guided in a perfectly straight line, even when tapping in long distance holes, while the threads are perfectly cut in the two sheets to exactly correspond one with the other, and provide perfectly threaded and centered holes for the reception of the stay-bolts.

Note.—Radial stays, when properly put in, are superior to any other means for staying the crown sheet of a locomotive boiler.

In ordering give the diameter of taps, number of threads per inch, and longest distance between sheets.

Price.....per set. \$50 00

PATENTED DEVICES.

For Drilling Out or Removing Old or Broken Stay-Bolts from the Fire-Boxes of Locomotives without the Displacement of any of the Intervening Parts of the Engine.

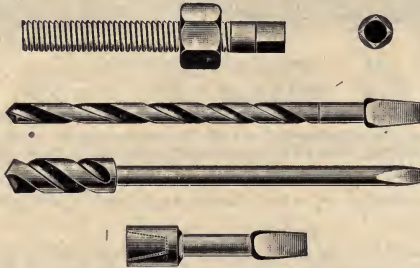


Fig. D. 1026.

Directions for Using.

When old or broken stay-bolts need replacing, to which access from the outside is prevented by the intervening frame, drivers, etc., ready access to the part in the inner sheet is had from the inside, and by proper drilling may be removed without injury to the thread in the hole of the fire-box sheet, and so that, if injured, the hole may be readily re-threaded upon the line and pitch of the old stay-bolt; but to accurately drill the part of the bolt that remains in the outer shell is a difficult matter, and accurate drilling is almost impossible in the old way.

To accurately drill and remove the portion of the old bolt from the outer sheet without injury to the latter, the externally threaded tubular drill guide is used, which is screwed into the thread of the old stay-bolt hole of the fire-box sheet by the wrench end, and made to approach the part of the bolt in the outer sheet. It does so in a straight line, being guided by the threaded walls of the hole in the fire-box sheet. When the tubular guide has been screwed in far enough, or so as to somewhat nearly approach the broken bolt end, it is firmly locked in position by the jam nut. The drill is now passed through the tubular guide and may be readily driven to accurately drill out or remove the bolt. In case a drill is used with a large point that will drill out the full size, which for general use is preferable, the stem may be passed through from the front end, and the guide then screwed in place. The small end of the stem may have a detachable wrench end, so as to adapt both drills to one ratchet-drill.

Price.....per set, \$35 00

ROTARY FLUE CLEANER.

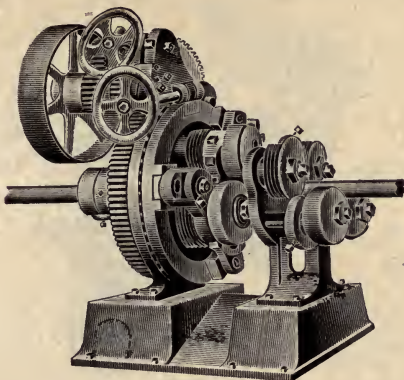


Fig. D. 1027.

All Cut Gears. For Tubes $1\frac{1}{2}$ inch—3 inch.

This machine is designed for the removal of scale from the outside surface of boiler tubes of different sizes, ranging from $1\frac{1}{2}$ to 3 inches outside diameter. It can be operated by a laborer who feeds the flues into the machine and they are automatically fed through and cleaned at the same time, coming out at the opposite end perfectly clean.

There are furnished with each machine 4 sets of collars for the different sizes of tubes.

The feed is arranged so that it is possible to run it in either direction by simply throwing the gears over by the upper hand wheel. The lower hand wheel is intended to open and close the cutters for the different sized tubes.

The driving pulley is 16 inches in diameter by 5 inches face and should be arranged to run from 200 to 400 revolutions per minute, depending on the size and the encrustation on the tubes. At 400 revolutions machine will clean 600 feet of 2-inch tube per hour.

The net weight of the machine is about 1,100 lbs.

Price on application.

PORTABLE CRANK-PIN TURNING MACHINE.

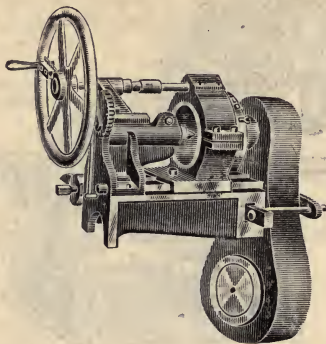


Fig. D. 1028.

This machine will accurately and quickly true up crank pins of locomotives and other engines that have been worn eccentric with the original centers.

The cut shows the machine set upon a crank to which it may be quickly set and clamped. It does very accurate work, leaving a smooth polished surface.

The feed is variable, reversible and automatic. The cutting tools are adjustable for light or heavy cuts.

The machine may be driven by hand or power.

Built in four sizes and furnished with sample tools and necessary wrenches.

Number.	Goes Over Collar of Diameter, Inches.	Turn Lengths, Inches.	Weight, Lbs. Boxed.
1	8	8	360
2	12	14	490
3	15	18	740
4	20	23	2,150

Prices on application.

PORTABLE CYLINDER BORING BAR.

Built in all sizes.

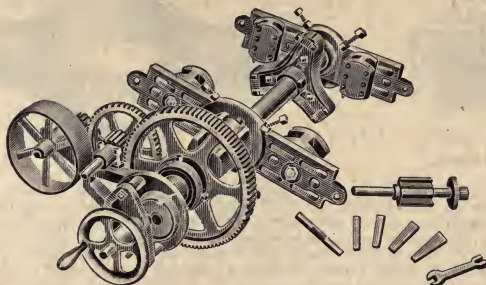


Fig. D. 1029.

This tool is designed to rebores cylinders of all sizes on Steam Engines, Pumps, Steam Hammers, Blowing Engines, Air Compressors, Mining Machinery, Hydraulic Machinery, Corliss Valve Cylinders, Heavy Housings or Fly Wheels. In fact any kind of cylinder boring may be done with these tools without removing them from their foundations.

Bars are made of special steel accurately finished to gauges and are regularly furnished with cutter-heads as listed above. We are also prepared to furnish special sized cutter-heads when required.

Feed Screw is of steel, feed nut of steel and fitted with patent thrust bearing.

Feed Casing is of the open type and feed is constant or may be thrown out at the pleasure of the operator. Has two changes, fine feed for roughing, coarse feed for finishing cuts.

Driving Power: Bar is driven by train of powerful gears cut from the solid and is furnished with pulley.

Regular Equipment: Each bar is furnished with driving power, feed casing, pulley, 4 spacing blocks, 2 cross heads, 1 plain and 1 patent bearing, cutter-heads, as listed, expansion chuck, set of sample tools, bolts and wrenches, complete, ready for operation when taken from the box.

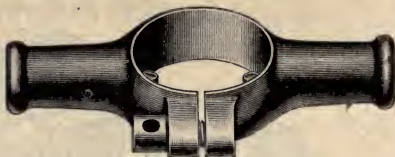
Diam. of Bar, Inches.	Length, of Bar, Feet.	Diam. Cylinder Will bore, Inches.	Length of Cylinder will Bore in Inches.		Diameter of Cutter-heads Furnished, Inches.	Weight, Boxed Lbs.
			With Both Heads off.	One Head off.		
2½	5	5-12	35	42	4½-5½-7-10	700
3	5½	6-16	40	47	6-8-10-12	800
3½	6	8-22	44	52	8-10-12-16	960
*4	6	12-26	42	50	12-16-20-24	1345
4	8	10-24	66	74	10-12-16-20	1550
*4½	6	16-36	42	50	16-20-24-30	1500
4½	8	12-30	66	74	12-16-20-24	1650
4½	10	12-30	90	98	12-16-20-24	1750
6	10	20-50	85	95	20-26-34-42	3000

*Special Locomotive Cylinder Boring Bars.

Prices on application.

SCREW PLATES.

Green River.

Fig. D. 1030.
Die and Guide.Fig. D. 1031.
Stock.

The illustration shows a Die and Guide for Green River Plates. The cup-headed screw on the left (Fig. D. 1030) holds the halves firmly together, acting as a hinge, while the size is regulated by the wedge-shaped (taper head) screw on the right, the whole being clamped in the elastic stock (Fig. D. 1031).

Can supply Screw Plates with exact sizes V, U. S. Standard, or Franklin Institute and Whitworth form of thread, at regular prices, when ordered.

In ordering Dies, Guides, Collets or Stocks for Screw Plates, care should be taken to give number of set for which parts are wanted.

The following Sets include Taps, Dies and Guides complete in wood case:

Set.	Length Stock.	Diam., Dies.	Taps, Dies and Guides.	Price.	Price with Tap Wrench.
127	{ 6	$\frac{7}{16}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	\$10 25	
1127	{ 10	$1 \frac{1}{8}$	as above		\$12 40
128	{ 6	$\frac{7}{16}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	13 00	
1128	{ 18	$2 \frac{3}{8}$	as above		15 15
130	{ 6	$\frac{7}{16}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	21 00	
1130	{ 18	$2 \frac{3}{8}$	as above		23 15
129	{ 6	$\frac{7}{16}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	17 50	
1129	{ 22	$2 \frac{3}{8}$	as above		20 25
131	{ 6	$\frac{7}{16}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	20 75	
1131	{ 22	$2 \frac{3}{8}$	as above		23 50
101	18	$2 \frac{3}{8}$	$\frac{1}{16}$ to $\frac{1}{2}$ by 16ths....	11 00	
1102	...	...	as above		12 00
123	22	$2 \frac{3}{8}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	10 25	
1124	...	...	as above		11 25
103	...	...	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	13 00	
1104	...	...	as above		14 00
125	...	...	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$ }	15 25	
1125	...	...	as above		16 25
132	{ 10	$1 \frac{1}{8}$	$\frac{1}{16}, \frac{1}{8}, \frac{3}{16}, \frac{1}{4}$ }	14 50	
1132	{ 22	$2 \frac{3}{8}$	as above		15 50
105	23	$2 \frac{1}{4}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$	14 25	
1106	...	...	as above		15 25
107	29	$2 \frac{1}{4}$	$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, 1$	15 75	
1108	...	...	as above		16 75

Above furnished to exact size.

Discount.....

Continued on page 549. Prices of partson page 549.

SCREW PLATES—Continued. **Green River.**

Set.	Length Stock.	Diam. Dies.	Taps, Dies and Guides	Price.	Price with Tap Wrench.
109	29	2 $\frac{1}{4}$	$\frac{1}{8}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1....	\$20 00	
1110			..as above		\$21 00
111	29	2 $\frac{1}{4}$	$\frac{1}{8}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$ } ..	23 00	
1112	....	....	..as above		24 00
113	35	2 $\frac{1}{4}$	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{1}{4}$, 1, 1 $\frac{1}{2}$, 1 $\frac{1}{4}$..	26 00	30 75
114	35	2 $\frac{1}{4}$	$\frac{1}{8}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{1}{4}$ }	30 00	36 90
115	35	2 $\frac{1}{4}$	to $\frac{1}{2}$ by 16ths. } ..	34 00	40 90
116	53	3 $\frac{7}{16}$	to 1 $\frac{1}{2}$ by 8ths.	40 00	46 00
117	{ 18 29	2 $\frac{3}{8}$ 2 $\frac{1}{2}$	to 1 $\frac{1}{2}$ by 8ths. to $\frac{1}{2}$ by 16ths. } ..	25 00	
1118	....	....	..as above		26 00
119	{ 18 35	2 $\frac{3}{8}$ 2 $\frac{1}{2}$	to $\frac{1}{2}$ by 16ths. to 1 $\frac{1}{2}$ by 8ths. } ..	36 00	42 90
120	{ 22 53	2 $\frac{3}{8}$ 3 $\frac{7}{16}$	{ $\frac{1}{8}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$ } $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$ $\frac{1}{8}$, 1, 1 $\frac{1}{2}$, 1 $\frac{1}{4}$ }	53 00	61 75

Discount.

Will send above sets $\frac{1}{2}$ oversize, V thread, unless otherwise ordered. V thread exact size, United States Standard or Whitworth (English) Standard supplied at same price.

LIST PRICES OF PARTS.

Stocks.

Length (Inches).....	6	10	18	22	23	29	35	53	*48
Holding Dies and Guides (Diam.)....	$\frac{1}{8}$ in.	1 $\frac{1}{8}$ in	2 $\frac{3}{16}$ in	2 $\frac{3}{16}$ in	2 $\frac{3}{16}$ in	2 $\frac{3}{16}$ in	2 $\frac{3}{16}$ in	3 $\frac{7}{16}$ in	3 $\frac{7}{16}$ in
Price, Each.....	\$0 75	1 50	2 00	2 00	2 00	2 00	4 00	6 00	7 00

*Has four handles. All others have two handles.

Discount.

Taps, Dies and Guides.

Sizes, Inches.....	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1 $\frac{1}{2}$
Taps, Each.....	\$0 35	\$0 45	\$0 50	\$0 55	\$0 60	\$0 70	\$0 80	\$0 90	\$1 05
*Dies, Each.....	1 25	1 25	1 25	1 50	1 50	1 50	1 60	1 75	1 90
*Guides, Each.....	25	25	25	25	25	25	25	25	25

Sizes, Inches.....	$\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
Taps, Each.....	\$1 20	\$1 40	\$1 60	\$1 80	\$2 00	\$2 25	\$2 60	\$3 00	\$3 50
*Dies, Each.....	2 00	2 25	2 50	2 75	3 00	3 50	4 00	4 50	5 00
*Guides, Each.....	25	25	25	25	25	25	25	25	25

*When ordering dies and guides, be sure to state sizes and outside diameter.

*Dies and guides, 2 $\frac{3}{16}$ in. diam. furnished for sizes $\frac{1}{16}$ in. to $\frac{1}{2}$ in. only.

*Dies and guides, 2 $\frac{1}{2}$ in. diam. furnished for sizes $\frac{1}{8}$ in. to 1 $\frac{1}{2}$ in. only.

*Dies and guides, 3 $\frac{1}{16}$ in. diam. furnished for sizes $\frac{1}{4}$ in. to 1 $\frac{1}{2}$ in. only.

Discount.

SCREW PLATES.

Lightning.



Fig. D. 1032.



Fig. D. 1033.

Set.	Length Stock.	Diam., Collets.	Taps, Dies and Collets.	Price.	Price with Tap Wrench.
190	18 in.	2 $\frac{3}{16}$	$\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$	\$11 75	
1191			..as.above.....		\$12 50
188	23 in.	2 $\frac{1}{4}$	$\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$	12 25	
1189	"	"	..as.above.....		13 00
192	"	"	$\frac{1}{4}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$	14 50	
1193	"	"	..as.above.....		15 25
206	"	"	$\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{1}{16}$, $\frac{5}{8}$, $\frac{3}{4}$	16 75	
1207	"	"	..as.above.....		17 50
194	"	"	$\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1.....	15 75	
1195	"	"	..as.above.....		16 75
196	"	"	$\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1.....	20 00	
1197	"	"	..as.above.....		21 00
198	"	"	$\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1.....	23 25	
1199	"	"	..as.above.....		24 25
200	53 in.	4 $\frac{1}{4}$	$\frac{1}{4}$, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 1 $\frac{3}{4}$, 1 $\frac{1}{2}$	42 75	48 75
201	{ 18 "	2 $\frac{3}{16}$	$\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$	16 00	
	{ 23 "	2 $\frac{1}{4}$	$\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$		
1202			..as.above.....		16 75
203	{ 18 "	2 $\frac{3}{16}$	$\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$	25 25	
	{ 29 "	2 $\frac{1}{4}$	$\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1.....		
1204			..as.above.....		26 25
205	{ 23 "	2 $\frac{1}{4}$	$\frac{1}{2}$, $\frac{1}{16}$, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$	57 00	65 75
	{ 53 "	4 $\frac{1}{4}$	$\frac{1}{2}$, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 1 $\frac{3}{4}$, 1 $\frac{1}{2}$		

Will send above sets $\frac{1}{32}$ oversize, V thread, unless otherwise ordered. V thread exact size, United States Standard or Whitworth (English) Standard supplied at same price.

Discount.....

Stocks only.			Dies, Taps and Collets.								
Length, Inches.	Holding Collets, Inches.	Price, Each.	Sizes, Inches.	Price, Each.			Sizes, Inches.	Price, Each.			
				Dies.	Taps	Collets.		Dies.	Taps	Collets.	
18	2 ¹ / ₈ Dia.	\$2 00	³ / ₁₆	\$1 00	\$0 35	\$0 50	⁵ / ₈	\$1 75	\$0 90	\$0 50	
23	2 ³ / ₄ "	2 00	¹ / ₄	1 00	45	50	¹¹ / ₁₆	1 90	1 05	50	
29	2 ³ / ₄ "	2 00	³ / ₈	1 00	50	50	³ / ₄	2 00	1 20	50	
53	4 ¹ / ₄ "	7 00	¹ / ₂	1 15	55	50	⁷ / ₈	2 25	1 40	50	
.....	.....	.....	⁵ / ₈	1 30	60	50	¹ / ₂	2 50	1 60	50
.....	.....	.....	⁷ / ₈	1 50	70	50	¹ / ₈	2 75	1 80	50
.....	.....	.....	¹ / ₂	1 60	80	50	¹ / ₁₆	3 00	2 00	50
.....	.....	.....	¹ / ₈				1			

Discount.....

SCREW PLATES.

Little Giant.

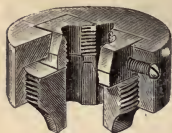


Fig. D. 1034.



Fig. D. 1035.

The Little Giant Die.

The Collet, or holder, is made of two pieces, a Cap and a Guide. The Cap has a bevel slot into which the bevel of Die is fitted. The Guide is screwed into the Cap, which throws the Die into the bevel of the Collet, and into line. To adjust, turn the screws at ends of Dies in or out, as the adjustment desired requires.

Each assortment is put up in a neat wood case.

Set.	Length Stock, Inches.	Diam. Collets, Inches.	Taps and Dies.	Price with Tap Wrench.
A 1	7½	1½	1, 5/32, 3/8, 7/32, 1/2	\$ 6 50
A 2	7½	1½	1, 7/32, 1/2, 5/8, 3/2, 1/2, 3/2, 1/2	8 00
A 3	7½	1½	1, 7/32, 1/2, 5/8, 3/2, 1/2, 3/2, 1/2	10 50
1	14½	2	1, 1/2, 3/4, 1/2, 1/2	12 00
2	23	2 3/4	1, 1/2, 3/4, 1/2, 1/2	13 50
3	26	2 3/4	1, 1/2, 3/4, 1/2, 1/2	15 00
4	26	2 3/4	1, 1/2, 3/4, 1/2, 1/2	17 50
5	23	2 3/4	1, 1/2, 3/4, 1/2, 1/2	16 00
6	26	2 3/4	1, 1/2, 3/4, 1/2, 1/2	22 00
7	26	2 3/4	1, 1/2, 3/4, 1/2, 1/2	25 50
8	{ 14½ 26	2 2 3/4	1, 1/2, 3/4, 1/2, 1/2	18 00
9	{ 14½ 29	2 2 3/4	1, 1/2, 3/4, 1/2, 1/2	27 50
20	40	4	1, 1/2, 3/4, 1/2, 1/2	35 00
25	52	4 1/2	1, 1/2, 3/4, 1/2, 1/2	45 00
30	52	4 1/2	1, 1/2, 3/4, 1/2, 1/2	37 50
40	{ 23 40	2 3/4 4	1, 1/2, 3/4, 1/2, 1/2	40 00
50	{ 26 52	2 3/4 4 1/2	1, 1/2, 3/4, 1/2, 1/2	60 00

Above Dies and Taps will be sent $\frac{1}{2}$ oversize (for rough iron), with threads **v** form, unless otherwise ordered.

Can supply Screw Plates with exact sizes V, U. S. Standard, and Whitworth form of thread, at regular prices when ordered.

U. S. Standard thread always sent, unless otherwise specified.

Discount

ARMSTRONG TOOL HOLDERS.

Straight Shank.



Fig. D. 1036.

Complete with Drop Forged Wrench and two Self-hardening Steel Cutters ground to shape.

No.	Size of Holder.	Size of Cutter.	Net Weight.	Price Complete	Extra Cutters, Each.
00-S	$\frac{5}{16}$ x $\frac{3}{4}$ x $4\frac{1}{2}$ in.	$\frac{3}{16}$ in. Square	0 lbs. 7 oz.	\$ 1 60	\$0 10
0-S	$\frac{3}{8}$ x $\frac{1}{2}$ x 5 "	$\frac{1}{4}$ " " "	0 " 12 "	1 65	12
1-S	$\frac{1}{2}$ x $1\frac{1}{2}$ x 6 "	$\frac{1}{8}$ " " "	1 " 4 "	1 80	18
2-S	$\frac{3}{4}$ x $1\frac{1}{2}$ x 7 "	$\frac{1}{8}$ " " "	2 " 0 "	2 30	25
3-S	$\frac{1}{2}$ x $1\frac{1}{2}$ x 8 "	$\frac{1}{8}$ " " "	3 " 4 "	3 00	35
4-S	$\frac{3}{4}$ x $1\frac{1}{2}$ x 9 "	$\frac{1}{8}$ " " "	4 " 8 "	3 80	45
5-S	1 x 2 x 11 "	$\frac{1}{8}$ " " "	7 " 8 "	4 75	65
6-S	$1\frac{1}{4}$ x 2 x 13 "	$\frac{1}{8}$ " " "	11 " 8 "	7 00	1 00
7-S	$1\frac{1}{2}$ x 2 x 16 "	$\frac{1}{8}$ " " "	19 " 8 "	12 00	1 75
750-S	$1\frac{1}{2}$ x 2 x 18 "	1 " " "	25 " 0 "	17 50	2 50
800-S	$1\frac{1}{4}$ x 2 x 20 "	$1\frac{1}{8}$ " " "	37 " 0 "	23 00	3 25

Off-Set Holders.



Fig. D. 1037.

Fig. D. 1038.

Complete with Drop Forged Wrench and two Self-hardening Steel Cutters ground to shape.

Left Hand No.	Right Hand No.	Size of Holder.	Size of Cutter.	Net Weight.	Price Complete	Extra Cut'trs Each.
00-L	00-R	$\frac{5}{16}$ x $\frac{3}{4}$ x $4\frac{1}{2}$ in.	$\frac{3}{16}$ in. sq.	0 lbs. 8 oz.	\$ 1 60	\$0 10
0-L	0-R	$\frac{3}{8}$ x $\frac{1}{2}$ x 5 "	$\frac{1}{4}$ " " "	0 " 14 "	1 65	12
1-L	1-R	$\frac{1}{2}$ x $1\frac{1}{2}$ x 6 "	$\frac{1}{8}$ " " "	1 " 10 "	1 80	18
2-L	2-R	$\frac{3}{4}$ x $1\frac{1}{2}$ x 7 "	$\frac{1}{8}$ " " "	2 " 8 "	2 30	25
3-L	3-R	$\frac{1}{2}$ x $1\frac{1}{2}$ x 8 "	$\frac{1}{8}$ " " "	4 " 0 "	3 00	30
4-L	4-R	$\frac{3}{4}$ x $1\frac{1}{2}$ x 9 "	$\frac{1}{8}$ " " "	5 " 10 "	3 80	45
5-L	5-R	1 x 2 x 11 "	$\frac{1}{8}$ " " "	8 " 4 "	4 75	65
6-L	6-R	$1\frac{1}{4}$ x 2 x 13 "	$\frac{1}{8}$ " " "	12 " 8 "	7 00	1 05
7-L	7-R	$1\frac{1}{2}$ x 2 x 16 "	$\frac{1}{8}$ " " "	24 " 4 "	12 00	1 75
750-L	750-R	$1\frac{1}{2}$ x 2 x 18 "	1 " " "	30 " 0 "	17 50	2 50
800-L	800-R	$1\frac{1}{4}$ x 2 x 20 "	$1\frac{1}{8}$ " " "	41 " 0 "	23 00	3 25

Discount.....

ARMSTRONG TOOLS.**Planer Tool.**

Fig. D 1039.

One of these Tools equipped with an assortment of properly ground Cutters will effectively equal a complete set of forged Planer Tools.

Complete with two Self-hardening Steel Cutters, ground to shape, and a Drop Forged Wrench carefully fitted.

No.	Size of Shank.	Length.	Size Cutter.	Weight.	Price, Complete.	Extra Cutters.
40	$\frac{1}{2}$ x 1 in.	7 in.	$\frac{1}{2}$ x $\frac{3}{4}$ in.	2 lbs. 0 oz.	\$ 2 75	\$0 20 each.
401	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "	$\frac{1}{2}$ x $\frac{7}{8}$ "	3 " 0 "	3 50	30 "
41	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	10 "	$\frac{1}{2}$ x $\frac{7}{8}$ "	4 " 11 "	4 50	40 "
42	1 $\frac{1}{2}$ x 1 $\frac{1}{2}$ "	13 "	$\frac{1}{2}$ x $\frac{7}{8}$ "	10 " 9 "	7 00	70 "
43	1 $\frac{1}{2}$ x 2 "	16 "	$\frac{1}{2}$ x $\frac{7}{8}$ "	18 " 13 "	11 00	1 00 "
44	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$ "	19 "	$\frac{1}{2}$ x 1 "	32 " 8 "	16 00	2 00 "
45	2 $\frac{1}{2}$ x 2 $\frac{1}{2}$ "	22 "	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	50 " 0 "	25 00	3 00 "

Discount.....

Cutting-Off Tools.

These are the most convenient and reliable Cutting-off Tools made.



STRAIGHT CUT OFF TOOL

Fig. D. 1040.



RIGHT HAND CUT OFF TOOL

Fig. D. 1041.



LEFT HAND CUT OFF TOOL

Fig. D. 1041 A.

Complete with Drop Forged Wrench and one Self-hardening Steel Blade.

Left Hand Off-set.	Straight Shank.	Rig't Hand Off-set.	Size of Shank.	Size of Blades.	Price, Complete.	Extra Blades.
No. 29-L	No. 19	No. 29-R*	$\frac{1}{2}$ x $\frac{3}{4}$ in.	$\frac{1}{2}$ x $\frac{1}{2}$ in.	\$1 65	\$0 25 each.
" 30-L	" 20	" 30-R	$\frac{3}{8}$ x $\frac{7}{8}$ "	$\frac{3}{2}$ x $\frac{5}{8}$ "	1 65	25 "
" 31-L	" 21	" 31-R	$\frac{3}{8}$ x 1 "	$\frac{1}{2}$ x $\frac{1}{2}$ "	1 80	35 "
" 32-L	" 22	" 32-R	$\frac{3}{8}$ x 1 $\frac{1}{2}$ "	$\frac{1}{2}$ x $\frac{1}{2}$ "	2 30	45 "
" 33-L	" 23	" 33-R	$\frac{3}{8}$ x 1 "	$\frac{3}{4}$ x 1 "	3 00	60 "
" 34-L	" 24	" 34-R	$\frac{7}{8}$ x 1 "	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	3 80	75 "
" 35-L	" 25	" 35-R	1 x 2 "	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	4 75	95 "
" 36-L	" 26	" 36-R	1 $\frac{1}{2}$ x 2 $\frac{1}{2}$ "	$\frac{1}{2}$ x 1 $\frac{1}{2}$ "	6 50	1 25 "

*Formerly listed as No. 00-C.

Discount.....

ARMSTRONG BORING TOOLS.

This tool is guaranteed to be as stiff and to take as heavy a cut as any forged tool of same size, and as it will take the place of about one dozen forged tools, the great economy effected by its use can readily be seen.

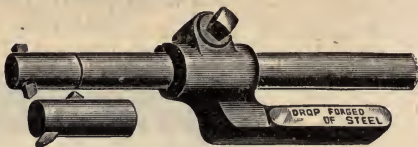


Fig. D. 1042.

Set consists of Holder and Bar with Straight and 45-degree End Caps, two Cutters (ground for boring) and a double end wrench.

No.	Size of Shank.	Diam. Bar.	Size of Cutter.	Weight.	Price, Complete.	Extra Cutters Ground for Boring.
00B	$\frac{3}{16}$ x $\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$\frac{3}{16}$ -inch square	1 lb. 12 oz.	\$ 3 00	\$0 12 each
8	$\frac{1}{4}$ x $\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{4}$ "	2 " 0 "	3 00	12 "
9	$\frac{1}{2}$ x 1 "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	4 " 0 "	3 60	15 "
10	$\frac{3}{4}$ x 1 "	$\frac{3}{4}$ "	$\frac{3}{4}$ "	7 " 5 "	4 75	20 "
11	$\frac{1}{2}$ x 1 "	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "	12 " 5 "	6 75	30 "
12	$\frac{3}{4}$ x 1 "	1 $\frac{5}{8}$ "	1 $\frac{5}{8}$ "	17 " 12 "	10 00	40 "
13	1 x 2 "	1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	26 " 0 "	14 00	50 "

Discount.....

Adapted to Use in Large Lathes with Clamp Tool Rest.

The great convenience and economy of the regular Armstrong Boring Tool has created a large demand for a similar tool for use on heavy lathes, which are generally equipped with a clamp tool rest instead of the ordinary slotted tool post. The holder or shank is machined from bar steel and case hardened.

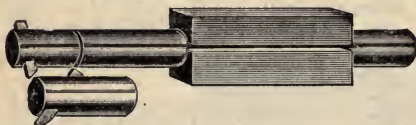


Fig. D. 1043.

cutters (ground for boring) and double end wrench.

No.	Size of Shank.	Diameter of Bar.	Length of Bar.	Size of Cutter.	Price Complete, Each.	Extra Cutters, Each.
108	$\frac{1}{2}$ x in.	$\frac{1}{2}$ inches.	9 inches.	$\frac{1}{2}$ in. sq.	\$2 50	\$0 12
109	1 x 1 "	$\frac{3}{4}$ "	11 "	$\frac{3}{4}$ "	3 00	15
110	1 $\frac{1}{2}$ x 1 "	1 $\frac{1}{8}$ "	13 "	1 $\frac{1}{8}$ "	4 00	20
111	1 $\frac{3}{4}$ x 1 "	1 $\frac{1}{2}$ "	16 "	1 $\frac{1}{2}$ "	5 75	30
112*	1 $\frac{1}{2}$ x 1 "	1 $\frac{1}{8}$ "	18 "	1 $\frac{1}{8}$ "	8 00	40
113†	2 x 2 "	1 $\frac{1}{2}$ "	21 "	1 $\frac{1}{2}$ "	10 50	50
114§	2 $\frac{1}{2}$ x 2 "	1 $\frac{3}{4}$ "	24 "	1 $\frac{3}{4}$ "	13 75	70
115	2 $\frac{1}{2}$ x 2 "	2 $\frac{1}{4}$ "	30 "	2 $\frac{1}{4}$ "	18 50	1 00

*Formerly listed as No. 15. †Formerly listed as No. 16. §Formerly listed as No. 17.

Discount.....

Armstrong Boring Tools, Less Shank.

In many cases it is very convenient and desirable to have a Boring Tool equipped with bars of different sizes. We are prepared to furnish extra bars with bushings, to fit same to shanks of larger size.

Price on application.

ARMSTRONG TOOLS.**Gang Planer for Planing Large Surfaces.**

This Tool is especially adapted for surfacing large castings, and on this class of work will effect a saving of 50 to 75 per cent in the time required to do the same job with a single point tool.

Both head and shank are drop forged of steel and all parts are hardened. The set screws are made from tool steel and are tempered on the point. The cutters are made from stock sizes and shape of self-hardening steel, which is readily obtainable.

Each tool is packed in a neat box, and the following price includes one set of Self-hardening Steel Cutters ground to shape, one Gauge for grinding Cutters, and a carefully fitted Wrench.



Fig. D. 1044.

No.	Size Shank, Inches.	Size Cutter, Inches.	Feed Ad- justment, Inches.	Price Complete.	Extra Cut- ters, Each.
61	1 1/2 x 1 1/2 x 7 1/2	3/4 x 1/2	0 to 1/4	\$12 00	\$0 35
62	1 1/2 x 2 1/2 x 9	3/4 x 1/2	0 to 1/4	20 00	60
63	2 x 2 1/2 x 11	3/4 x 1/2	0 to 1/2	35 00	1 00

THREADING TOOL.

Simplicity, Strength and Permanence of Adjustment are Prominent Features of This Tool.

The Cutters used in the Armstrong Threading Tool require grinding on the top edge only to sharpen, and therefore always remain true to form and of correct angle; its use thus insures perfect fitting threads and saves much grinding, as well as dispensing entirely with forging and tempering.

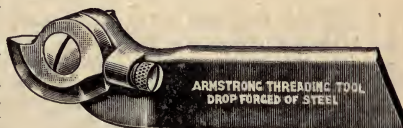


Fig. D. 1045.

Complete with Drop Forged Wrench and One Single Point Cutter.

No.	Size Shanks.	Price, Complete with V or U. S. Standard Cutter.	Price, Complete with Whitworth Cutter.
00T	1 1/2 x 3/4 x 5 in.	\$2 25	\$2 50
50	1 1/2 x 1 x 5 "	2 25	2 50
51	1 1/2 x 1 1/2 x 5 "	2 75	3 10
52	1 1/2 x 1 x 7 "	3 50	4 00
53	1 1/2 x 1 x 8 "	4 50	5 00
54	1 1/2 x 1 x 9 "	5 50	6 00
55	1 x 2 x 10 "	7 00	7 70

Price List of Extra Cutters.

For Tool No.	00T and 50		51		52		53 and 54		55
	Single Point.	Chaser	Single Point.	Chaser.	Single Point.	Chaser.	Single Point.	Chaser.	Single Point.
Sharp V.....	\$0 45	\$0 90	\$0 55	\$1 05	\$0 70	\$1 20	\$0 90	\$1 30	\$1 25
U. S. Standard.....	50	90	60	1 05	75	1 20	95	1 30	1 35
Whitworth	75	1 25	90	1 40	1 15	1 65	1 40	1 80	1 95

NOTE.—In ordering U. S. or Whitworth Cutters, be careful to specify number of threads per inch wanted. Tools equipped with single point sharp V Cutter will always be shipped unless otherwise specified.

Discount.....

ARMSTRONG SLOTTER TOOL.

Adapted to the Use of Inserted Cutters of Self-hardening Steel.

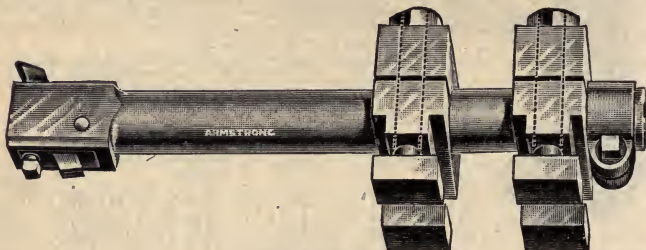


Fig. D. 1046.

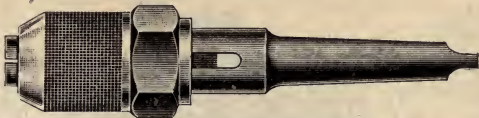
This tool is very stiff and easily adjustable to different lengths of stroke, and can be rotated conveniently for working into corners or in different positions. It has a spring relief block which saves the cutter point from wear and tear of the return stroke, and is so constructed as to be protected from chips and dirt. The cutter is fixed at an angle which allows it to take a clean curling chip without excessive top grinding, and as the point can be projected beyond the end of the bar it is possible to cut right down to the table.

Complete with Drop Forged Wrench and Two Self-hardening Steel Cutters.

No.	For Slotter	Diameter of Bar.	Length Over All.	Size of Cutter.	Price Complete.	Extra Cutters, Each.
91	6 and 8 in	1½ in.	16 in	7/16 x 9/16 in.	\$20 00	\$0 50
92	10 " 12 "	2 "	22 "	1/2 x 1 1/8 "	30 00	65
93	14 " 16 "	2 1/4 "	27 "	9/16 x 1 3/8 "	45 00	85
94	18 " 20 "	2 1/2 "	32 "	1 1/8 x 1 7/8 "	65 00	1 15
95	22 " 24 "	2 3/4 "	37 "	1 1/2 x 1 "	95 00	2 00

NOTE.—As there is considerable difference in size of the **T** slots of machines of different manufacture, the clamps and bolt heads of this tool are made of ample size to allow for fitting.

Discount

DRILL CHUCKS.**The National.****Fig. D. 1047.**

All taper shank Drills which have been thrown away and scrapped, on account of the tanges being broken off, can be used up successfully in this Chuck without preparing the broken shank.

No. 1 Chuck with extra split sleeve or reducer, will hold all sizes of Taper Shanks up to $\frac{3}{4}$ inch. It will also hold the Graham Grooved Shank Drill from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch, inclusive.

No. 2 Chuck will hold Taper Shank Drills from $\frac{5}{8}$ to $1\frac{1}{4}$ inch, and Graham Grooved Shank Drills from $\frac{1}{2}$ to $\frac{3}{4}$ inch, inclusive.

No. 3 Chuck will hold Taper Shank Drills from $1\frac{1}{4}$ to 2 inch, inclusive, and Graham Grooved Shank from $\frac{3}{4}$ to $1\frac{1}{4}$ inch, inclusive.

No. 1 Chuck only, with No. 2 or 3 Taper Shank.....each, \$4 50

Split Sleeve or Reducer, for Taper Shank.....each, 1 40

Sleeve for Graham Grooved Shank Drills.....each, 2 00

No. 2 Chuck only, with No. 3 or 4 Taper Shank.....each, 6 50

Split Sleeve or Reducer, for Taper Shank.....each, 1 80

Sleeve for Graham Grooved Shank Drills.....each, 2 50

No. 3 Chuck only, with No. 4 or No. 5 Taper Shank.....each, 9 00

Split Sleeve or Reducer for Taper Shank.....each, 2 20

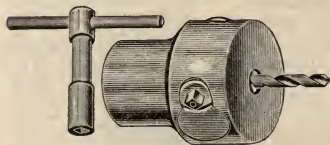
Sleeve for Graham Grooved Shank Drills.....each, 3 50

Discount.....

Horton.

Simple in construction, strong and durable; body composed of one piece metal; entire chuck of but four pieces.

Six sizes, $\frac{1}{4}$ in. to 2 in.

**Fig. D. 1048.****Style B.**

No.	Approximate Diameter of Body.	Will Hold Drill.	List Price.
0	$1\frac{3}{8}$ inch.	0 to $\frac{1}{4}$ inch.	\$7 00
1	$1\frac{1}{2}$ "	0 " $\frac{3}{8}$ "	7 50
2	$2\frac{1}{8}$ "	0 " $\frac{1}{2}$ "	8 00
3	$2\frac{1}{4}$ "	0 " $\frac{3}{4}$ "	9 00
4	$3\frac{1}{2}$ "	0 " 1 "	10 00
5	$5\frac{1}{4}$ "	0 " $1\frac{1}{2}$ "	18 00
6	$6\frac{3}{4}$ "	0 " 2 "	20 00

N. B. These chucks are designated by the size drill they will hold, or by numbers above.

Discount.....

DRILL CHUCKS.

Little Giant Improved. Extra Strong Screws.

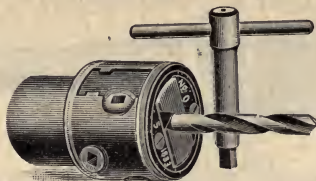


Fig. D. 1049.

Number.	Approximate Diameter.	Holding Drills.	Price.	Unfinished Face Plates.
00	1 $\frac{7}{8}$ inches	0 to $\frac{1}{2}$ inch.	\$ 7 00	
0	2 $\frac{1}{2}$ "	0 to $\frac{3}{4}$ "	8 00	
1	3 "	0 to $\frac{7}{8}$ "	9 00	
2	3 $\frac{1}{2}$ "	0 to 1 "	10 00	
2 $\frac{1}{2}$	4 "	0 to 1 " extra strong	11 00	
3	6 "	0 to 1 $\frac{1}{2}$ "	18 00	\$0 75
4	6 $\frac{1}{2}$ "	0 to 2 "	20 00	75

Discount.....

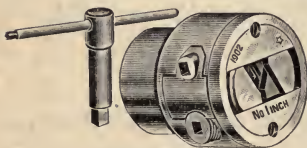
Little Giant Auxiliary Screw Drill Chuck.

Fig. D. 1050.

After closing jaws on drill in the usual manner (by turning right and left hand screw) then tighten the auxiliary screw. This will greatly increase the gripping power of Chuck. The effect of the auxiliary screw is similar to that of a bolt, as it virtually bolts the two jaws together. The hole in the hub is made to fit the Morse taper, but can be bored out and threaded to suit the customer's templet.

Extra Strong Screws.

Size No.	Approx. Diam.	Capacity.	Diam. of Recess for Face Plate.	Price.	Extra V Blocks Per Set.	Unfinished Face Plate Castings
$\frac{1}{2}$ inch	2 $\frac{1}{4}$ inch	0 to $\frac{1}{2}$ inch		\$ 8 00		
$\frac{3}{4}$ "	3 "	0 to $\frac{3}{4}$ "		9 00		
1 "	3 $\frac{1}{2}$ "	0 to 1 "		10 00		
1 $\frac{1}{4}$ "	4 $\frac{1}{8}$ "	$\frac{1}{2}$ to 1 $\frac{1}{4}$ "		15 00		
1 $\frac{1}{2}$ "	6 "	$\frac{3}{4}$ to 1 $\frac{1}{2}$ "	5 $\frac{1}{2}$ inch.	18 00	\$2 00	\$0 75
2 "	6 $\frac{1}{2}$ "	1 to 2 "	5 $\frac{1}{8}$ "	20 00	3 00	75
2 $\frac{1}{2}$ "	7 $\frac{1}{4}$ "	$\frac{1}{2}$ to 2 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "	30 00	4 00	1 00
3 "	9 "	$\frac{3}{4}$ to 3 "	8 "	35 00	4 00	2 00
3 $\frac{1}{2}$ "	11 "	$\frac{1}{2}$ to 3 $\frac{1}{2}$ "	10 "	50 00	5 00	3 00
4 "	13 $\frac{1}{4}$ "	$\frac{1}{2}$ to 4 "	10 "	60 00	5 00	3 00

Discount.....

DRILL CHUCKS.

Skinner. Geared Pattern.

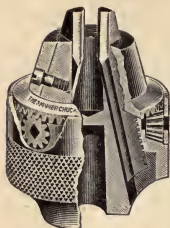


Fig. D. 1051.

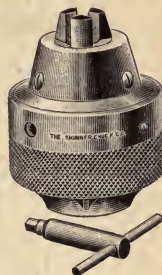


Fig. D. 1052.

Number.	Price, Each.	Capacity, Inches.	Outside Diameter, Inches.	Length of Body, Inches.	Total Length Jaws Extended, Inches.
21	\$6 00	0 to $\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{11}{16}$	$2\frac{1}{8}$
22	6 00	0 to $\frac{3}{8}$	$2\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{11}{16}$
23	10 00	0 to $\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$4\frac{1}{16}$
24	18 00	$\frac{1}{16}$ to $\frac{3}{4}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$5\frac{1}{8}$

Discount.....

SKINNER STANDARD.

Improved Pattern.



Fig. D. 1053.

This Chuck has no projecting jaws, and the plate prevents larger work than the Chuck is designed for being used. It is very powerful and guaranteed to hold true and not injure the shank of the drills. The jaws are guided by three strong gibs, and the screws are larger than in any Chuck of this description heretofore made. The jaws and screws are made from cast steel carefully tempered. The hole in the hub is made to fit taper arbor, but can be bored out and threaded to customer's templet at small cost.

Number.	Price, Each.	Capacity, Inches.	Diam- eter, Inches.	Length, Inches.
000	\$6 00	0 to $\frac{1}{4}$	$1\frac{3}{8}$	$2\frac{3}{4}$
00	6 50	0 to $\frac{3}{8}$	$1\frac{11}{16}$	$2\frac{11}{16}$
100	7 00	0 to $\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{11}{16}$
101	8 00	0 to $\frac{3}{4}$	$2\frac{1}{8}$	$3\frac{3}{8}$
102	10 00	0 to 1	$3\frac{1}{16}$	$4\frac{1}{4}$

Discount.....

LATHE CHUCKS.

Westcott's.

Spur (Not Bevel) Geared Scroll Combination Lathe Chuck.

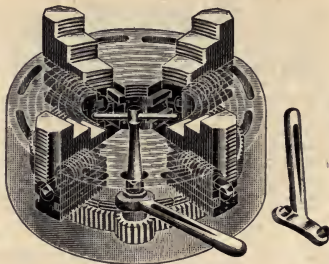


Fig. D. 1054.

Also Furnished as a Strictly Universal (not Combination) Chuck, at Same Price, if Desired.

In this new Geared Scroll Combination Chuck, the power applied to produce the universal movement of the jaws is transmitted by a strong Spur pinion which engages with a Spur gear cut on the Edge of the steel scroll.

The Spur pinion is operated by an open-end wrench, which enters through an opening in the edge of the Chuck, and engages with hexagon pinion-shaft, and may also be operated from the face of the Chuck by a socket wrench which fits square end of pinion-shaft.

The Jaw Screws have steel thrust bearings and are easily replaced.

The Chuck does not require any shifting in and out of gear, but is always ready to be operated either independently or universally at will. Jaws are reversible.

Diameter Over All.	Will Hold Inside of Jaws.	Diam. of Recess for Face Plate.	Three Jaws, Price.	Four Jaws, Price.	Unfinished Face Plates.
6 inches	6½ inches	.....	\$ 25 00	\$ 31 00	\$0 50
8 "	8½ "	3 ¾ inches	26 00	32 00	25
10½ "	12 "	5 "	34 00	42 00	50
13½ "	15 "	6 "	44 00	56 00	75
16 "	18 "	6½ "	52 00	64 00	1 00
18½ "	21½ "	7 ⅞ "	62 00	75 00	1 50
21½ "	26 "	9½ "	80 00	95 00	2 00
24 "	30 "	10 "	100 00	120 00	3 00
27 "	33 "	12½ "	135 00	160 00	3 50
30 "	36 "	12½ "	170 00	200 00	4 00
36 "	43 "	15 "	230 00	285 00	5 00

Discount.....

LATHE CHUCKS.

Westcott's.

Independent with Reversible Jaws.

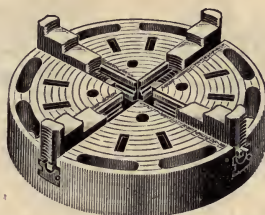


Fig. D. 1055.

When the I X L Chuck is required to hold work larger than its diameter remove the set-screws (two set-screws in each hole), and drive the screw-carriers outward, together with the jaws and their adjusting screws, thereby retaining the full thread bearing between screw and jaw, the screw-carrier still supporting jaw; thus we get the desired capacity without injury to Chuck. Another, and perhaps easier, method of manipulation is to screw the jaws against a block of wood or a piece of iron, thus forcing the screw-carriers together with the screws outward to the desired point, and then drawing jaws out by turning screw the other way. The jaw screws have steel thrust bearings and are easily replaced.

Diameter.	Capacity.	Approximate Weight.	Diameter of Center Hole.	Diameter of Recess for Face Plate.	Price with 3 or 4 Jaws.	Unfinished Face Plate Castings.
4 $\frac{3}{16}$ in.	5 $\frac{1}{2}$ in.	14 lbs.	1 in.	3 $\frac{1}{2}$ in.	\$ 14 00	\$0 50
6 "	6 $\frac{1}{2}$ "	22 "	1 $\frac{1}{4}$ "	5 $\frac{1}{16}$ "	18 00	1 00
8 "	9 "	39 "	1 $\frac{3}{8}$ "	4 $\frac{7}{16}$ "	22 00	1 00
10 $\frac{1}{8}$ "	12 "	51 "	2 "	5 $\frac{1}{2}$ "	26 00	1 25
12 "	15 "	72 "	2 $\frac{1}{2}$ "	5 $\frac{9}{16}$ "	30 00	1 25
13 $\frac{1}{4}$ "	17 "	88 "	3 "	6 $\frac{1}{2}$ "	32 00	1 50
14 "	18 "	92 "	3 "	6 $\frac{3}{4}$ "	34 00	1 50
16 "	20 "	139 "	3 "	7 $\frac{9}{16}$ "	38 00	2 00
18 $\frac{1}{2}$ "	23 "	180 "	4 "	8 "	44 00	2 50
21 $\frac{1}{4}$ "	26 "	228 "	4 "	9 $\frac{1}{2}$ "	55 00	3 50
24 "	30 "	241 "	4 $\frac{1}{2}$ "	10 "	65 00	4 00
27 "	33 "	400 "	4 $\frac{3}{4}$ "	12 $\frac{3}{4}$ "	95 00	4 50
30 "	36 "	447 "	6 "	12 $\frac{1}{2}$ "	120 00	5 00
36 "	43 "	650 "	7 $\frac{1}{4}$ "	15 "	210 00	6 00

Discount.....

LATHE CHUCKS.

Horton's.

Universal Common Jaw.

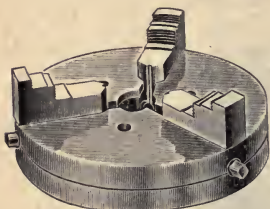


Fig. D. 1056.
4 to 12 inch.

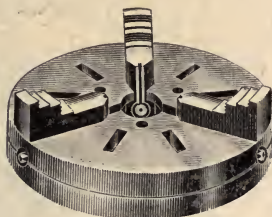


Fig. D. 1057.
15 to 42 inch.

A Universal Chuck is one in which all jaws are moved to and from the center by means of the chuck wrench being applied to any one of the driving screws. Chucks over 12 inches in diameter go entirely through the body of the Chuck, which makes it very convenient for bolting heavy work to it if required. Also made with driving screws flush with body.

Parties wanting this style should specify it in order.

The rated sizes of the Universal Chucks with Common Jaws, and of the Combination Chucks with Common Jaws is the capacity of the jaws to extend to take in work. For instance, a 9-inch Chuck will grip a piece of work from 9 inches in diameter down to the smallest, through all of the different sizes.

The dimensions given in the following table approximate accuracy. The approximate weights given are for the Universal Chuck. The Combination Chucks weigh about 10 per cent heavier in corresponding sizes.

Approximate Size of Body.	Requires Swing over all of about. Inches.	Jaws Extend to take in Work. In. Diam.	Approximate Weights, Including Bolts and Wrench.		Prices.	
			Three-Jaw. Lbs.	Four-Jaw. Lbs.	3-Jaw.	4-Jaw.
3 in. Chuck,	4 $\frac{1}{8}$	3	3 $\frac{1}{2}$	....	.....	.....
4 " "	5 $\frac{1}{8}$	4 $\frac{1}{8}$	6 $\frac{1}{2}$	....	.....	.....
5 " "	6 $\frac{3}{8}$	5 $\frac{1}{4}$	10	11	\$25 00	\$ 30 00
6 " "	7 $\frac{1}{4}$	7	13 $\frac{1}{2}$	13	26 00	32 00
9 " "	10 $\frac{3}{8}$	9	25	26	34 00	42 00
12 " "	13 $\frac{1}{2}$	12	44	45 $\frac{1}{2}$	44 00	56 00
15 " "	15 $\frac{3}{8}$	15	64	66	52 00	64 00
18 " "	17 $\frac{1}{2}$	18	80	85 $\frac{1}{2}$	62 00	75 00
21 " "	20 $\frac{3}{4}$	21	95	105	80 00	95 00
22 " "	21 $\frac{1}{2}$	22	101	....	90 00	110 00
24 " "	24	24	162	165	100 00	120 00
26 " "	26 $\frac{1}{2}$	26	....	185	130 00	160 00
30 " "	30	30	390	426	170 00	200 00
36 " "	36 $\frac{3}{8}$	36	....	....	230 00	285 00
42 " "	42 $\frac{1}{2}$	42	....	....	270 00	325 00

Discount.....

LATHE CHUCKS.

Horton's.

Combination Chuck with Reversible Jaws.

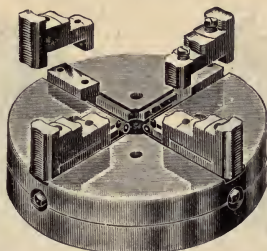


Fig. D. 1058.

A Combination Chuck is one in which the principles of both a Universal and an Independent Chuck are combined in such a way that it can be used as either. It is made with either three or four Jaws, and with Jaws reversible or non-reversible as wanted.

For weights and list prices see page 562.

Reversible Face-Plate Jaws.

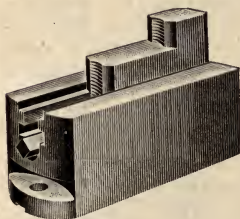


Fig. D. 1059.

Four of these bolted to the Face-Plate of a Lathe, or to the table of a boring mill, etc., make a good substitute for a large Independent Chuck. We recommend a Chuck instead of Face-Plate Jaws, unless one is wanted larger than a 42-inch. Above that size chucks are too heavy.

These Gripping Jaws slide in the body and are operated by means of a screw having a threaded bearing the entire length of the Jaws.

The Gripping Jaws are reversible the same as Jaws of our Improved Independent Chuck.

Bolts are not furnished with Face-Plate Jaws.

Prices and Approximate Dimensions.

Nominal size.....	8 inch	10 inch	12 inch	14 inch
Length of body.....	8 "	10 "	12 "	13½ "
Length over all.....	10½ "	13 "	15 "	16 "
Height of body.....	4½ "	4½ "	4½ "	4½ "
Weight, about.....	40 lbs.	58 lbs.	80 lbs.	100 lbs.
Price per set of three.....	\$45 00	\$60 00	\$ 90 00	\$120 00
Price per set of four.....	60 00	80 00	120 00	160 00

Discount.....

LATHE CHUCKS.

Horton's Improved Independent, with Reversible Jaws.
Hardened Steel Bearings.

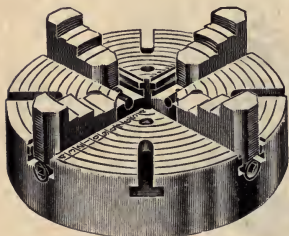


Fig. D. 1060.
Model 50—Front View.

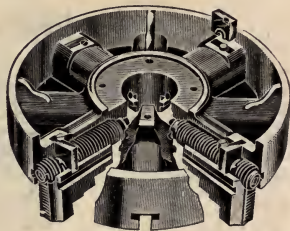


Fig. D. 1061.
Model 50—Back View.

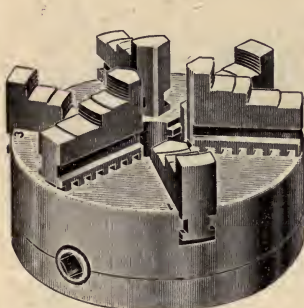
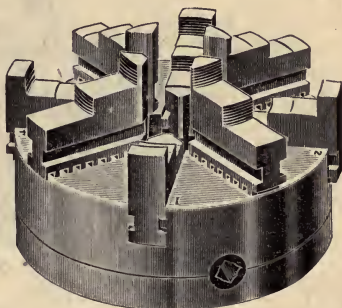
An Independent Chuck is one in which each Jaw moves independently of the others, by means of the Chuck Wrench being applied to each one of the Driving Screws in turn.

Sizes.	Approximate Weight of Chuck.	Diameter of Hole Through Center. Inches.	Diameter of Recess for Face Plate. Inches.	Price, Each.
4 inch	6 lbs.....	1	3	\$ 14 00
6 "	13 "	1 $\frac{1}{4}$	5 $\frac{1}{4}$	18 00
8 "	26 "	1 $\frac{3}{4}$	4 $\frac{1}{2}$	22 00
9 "	30 "	2	4 $\frac{1}{2}$	24 00
10 "	37 "	2	4 $\frac{1}{2}$	26 00
12 "	65 "	3	6 $\frac{1}{4}$	30 00
14 "	84 "	3	6 $\frac{1}{4}$	34 00
15 "	100 "	3	6 $\frac{1}{4}$	35 00
16 "	114 "	3	6 $\frac{1}{4}$	38 00
18 "	143 "	4	7 $\frac{1}{4}$	44 00
20 "	191 "	4	7 $\frac{1}{4}$	50 00
22 "	216 "	4 $\frac{1}{2}$	9 $\frac{1}{4}$	57 00
24 "	254 "	4 $\frac{1}{2}$	9 $\frac{1}{4}$	65 00
26 "	340 "	5 $\frac{1}{2}$	13	80 00
28 "	373 "	5 $\frac{1}{2}$	13	100 00
30 "	454 "	6	15	120 00
32 "	463 "	6 $\frac{1}{2}$	15	150 00
34 "	503 "	6 $\frac{1}{2}$	15	180 00
36 "	520 "	7 $\frac{1}{4}$	18	210 00
38 "	595 "	7 $\frac{1}{4}$	18	240 00
40 "	609 "	7 $\frac{1}{4}$	18	270 00
42 "	625 "	7 $\frac{1}{4}$	18	300 00

Discount.....

UNIVERSAL GEARED SCROLL CHUCKS.

Horton.

Fig. D. 1062.
3-Jaw.Fig. D. 1063.
4-Jaw.

It is admitted that in the smaller sizes a regular Screw Universal Chuck is not particularly adapted to be fitted with reversible jaws, or with two sets of jaws, therefore we have decided to show a line of Scroll Universal Chucks in sizes as described below, assuming that in sizes larger than those given herein the regular screw universal chuck will be preferred, because the mechanical principles involved in its construction enable it to grip harder, be more accurate and lighter in weight. In small sizes, when reversible jaws are wanted, we recommend the scroll type of chuck with two sets of jaws.

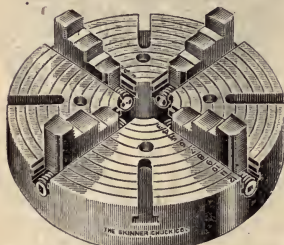
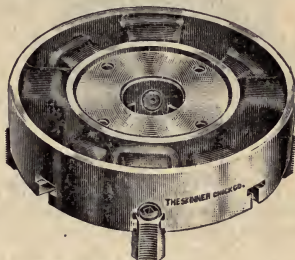
3-Jaw Chucks. Price, Each.			4-Jaw Chucks. Price, Each.		
Nominal Size.	1 Set of Jaws.	2 Sets of Jaws.	Nominal Size.	1 Set of Jaws.	2 Sets of Jaws.
3-inch Scroll Chuck..	\$10 00	\$12 00	4-inch Scroll Chuck..	\$13 00	\$16 40
4-inch Scroll Chuck..	12 00	14 40	5-inch Scroll Chuck..	16 20	20 50
5-inch Scroll Chuck..	15 00	18 00	6-inch Scroll Chuck..	19 50	24 60
6-inch Scroll Chuck..	18 00	21 60	7½-inch Scroll Chuck..	21 60	27 30
7½-inch Scroll Chuck..	20 00	24 00	9-inch Scroll Chuck..	26 00	32 40
9-inch Scroll Chuck..	24 00	28 80	10½-inch Scroll Chuck..	29 50	36 50
10½-inch Scroll Chuck..	27 00	32 40			

Discount.....

LATHE CHUCKS.

Skinner.

Independent, Figure 900 with Reversible Jaws.

Fig. D. 1067.
Front View.Fig. D. 1068.
Rear View.

This chuck has four solid jaws with half nut, reversible by running out of chuck at the periphery, and turning end for end. The jaws are hardened, having raised and ground steps. The face of chuck is ground true to straight edge and is accurately graduated in inches. Now fitted with "Hardened Steel Bearings" for the jaw adjusting screws, insuring the chuck long life.

The above illustration shows a 12-inch chuck. The smaller chucks have no slot in face, but in the larger sizes have additional slots.

Number	Rated Size, Inches.	Will Hold About, Inches.	Approximate Weight, Lbs.	Price, Each.
904	4½	6	10	\$ 14 00
906	6	7½	17	18 00
908	8	9½	34	22 00
909	9	11½	42	24 00
910	10	12½	49	26 00
912	12	14½	80	30 00
914	14	16½	105	34 00
915	15	18	122	36 00
916	16	19	133	38 00
918	18	21	175	44 00
920	20	23	195	50 00
921	21	24	215	55 00
922	22	25	226	57 00
924	24	27	270	65 00
926	26	29	315	80 00
928	28	31	340	100 00
930	30	35	485	120 00
936	36	41	715	210 00

Discount

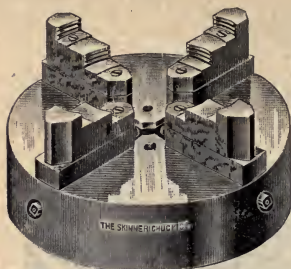


Fig. D. 1069. Front View.

A Combination Chuck is a combination of a Universal and Independent Chuck. The jaws may be operated universally or independent as desired. These Chucks are also furnished in the Universal pattern, three or four-jawed and with other style jaws if desired.

LATHE CHUCKS.

Skinner.
Combination with Reversible Jaws.

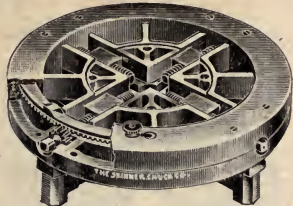


Fig. D. 1070. Back View.

Number.		Rated size Inches.	Will Hold. About, Inches.	Price Each.	
3-Jaw.	4-Jaw.			3-Jaw.	4-Jaw
603J		3	3½	18 00	
604J	804J	4	4½	22 00	26 00
605J	805J	5	5½	25 00	30 00
606J	806J	6	7½	26 00	32 00
608J	808J	8	8½	30 00	38 00
609J	809J	9	9½	34 00	42 00
612J	812J	12	12½	44 00	56 00
615J	815J	15	16½	52 00	64 00
618J	818J	18	18½	62 00	75 00
621J	821J	21	21½	80 00	95 00
624J	824J	24	25	100 00	120 00
626J	826J	26	28½	130 00	160 00
630J	830J	30	31½	170 00	200 00
636J	836J	36	37	230 00	285 00
642J	842J	42	42½	270 00	325 00

Discount.....

SKINNER FACE PLATE JAWS.

Fig. D. 1071.
(Enlarged Cut.)

There is a rib 1½-inch wide on the bottom of these jaws cast solid with body, which can be fitted to slot in face plate. The rib adds strength to the jaws.

Size.....inches	6	8	10	12	14
Length of Body, ins.	6	8	10	12	14
“ Over All, “	9½	11½	14½	16½	18½
Height of Body, “	3½	4	4½	4½	5
Width “ “ “	3½	4½	4½	4½	4½
Length of Sliding Jaw.....ins.	5½	6½	7½	7½	9
Width of Sliding Jaw.....ins.	1½	2	2	2	2
Weight per Set of Four Jaws...lbs.	100	185	240	270	375
Price per Set of Three.....	\$36 00	45 00	60 00	90 00	120 00
Price per Set of Four.....	48 00	60 00	80 00	120 00	160 00

Discount.....

SKINNER TWO-JAW CHUCKS.

Style "Q" Jaws.

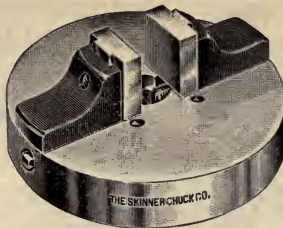


Fig. D. 1072.

Furnished in the Universal, Combination or Independent pattern, and recommended for holding odd shaped pieces, which need a bearing all around, any delicate work which would be crushed if gripped at points. One set of machined steel slip jaws are furnished with each Chuck, and extra pairs of slip jaws of machinery or tool steel can be furnished.

Used largely by brass workers.

Use these Numbers in ordering.			Rated Size of Chuck, Inches.	Price, Each.	Extra Slip Jaws Machinery Steel, Per Set.
Universal.	Combina- tion.	Inde- pendent.			
204 G	504 G	704 G	4	\$22 00	\$1 75
205 G	505 G	705 G	5	23 00	1 75
206 G	506 G	706 G	6	24 00	2 00
208 G	508 G	708 G	8	30 00	3 00
209 G	509 G	709 G	9	32 00	3 00
212 G	512 G	712 G	12	42 00	3 50
215 G	515 G	715 G	15	50 00	4 00

Discount.....

No. 27 Universal Box Body with Slip Jaws.

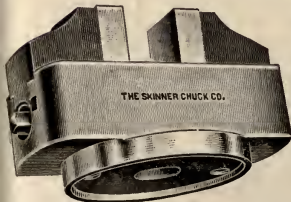


Fig. D. 1073.

Nominal Size and Length of Body, .....ins.	7	9	12	15	18
Width of Body, ins.	3½	4	4½	5	5½
Width of Jaws, " "	1½	2	2½	2½	2½
Face of Body to Top of Jaws .....ins.	1½	2	2½	3½	6
Price.....each	\$24 00	30 00	36 00	42 00	60 00
Price, Extra Mach. Steel Slip Jaws.....each	1 00	1 25	1 25	1 50	2 00

Chuck with hub for threading to screw on lathe spindle can be furnished if desired.

Above also furnished in Independent pattern
No. 28.

Discount.....

SKINNER PLANER CHUCKS.

Round Swivel Base.

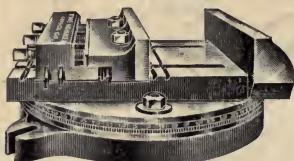


Fig. D. 1074.

Square Base.

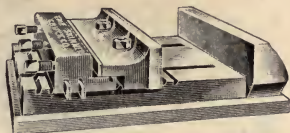


Fig. D. 1075.

Round Swivel Base Chuck.

Size Chuck, No.	Price, Each.	Length of Jaw, *Inches.	Depth of Jaw, *Inches.	Jaws will Open, *Inches.	Space Required, Inches.
6	\$ 25 00	7	1 1/2	3 1/2	10
8	30 00	9	1 1/2	5	11 1/2
10	36 00	11	2	6	14
12	40 00	13	2	8	16
15	50 00	15 1/2	2	9 1/2	20
18	60 00	18	2	11 1/2	22
24	90 00	24 1/2	2	16	26
30	140 00	30 1/2	3	21 1/2	33

Square Base Chuck.

Size Chuck, No.	Price, Each.	Space Required, Inches.
6	\$ 20 00	7 1/2 x 11
8	25 00	9 x 12 1/2
10	30 00	11 x 15
12	35 00	13 x 17
15	45 00	15 1/2 x 21
18	55 00	18 1/2 x 24
24	75 00	24 1/2 x 28
30	120 00	30 1/2 x 34

*Round swivel base and square base, same dimensions.

Round base chucks have a rib 1 1/4 inches wide cast on bottom to fit in planer table.

Square base chucks have a flange on all sides for clamping to planer table. A wrench is furnished with each chuck.

Discount.....

SKINNER DRILL PRESS VISE.

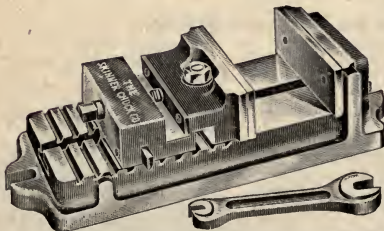


Fig. D. 1076.

The jaws are faced with steel. Nuts and screws are hardened. Vise is provided with lugs so that it may be tipped on the side for drilling holes at right angles.

It is a very handy tool to have in the machine shop.

Discount.....

Size.....inches	4 1/2	5 1/2
Width of Jaws.inches	4 1/2	5 1/2
Depth of Jaws. "	2	2
Jaws Open.... "	5	6
Space Required "	14x5 1/2	15x6
Approximate Shipping Wt. lbs.	35	45
Price.....each	\$15 00	\$18 00

A forged steel wrench is furnished with each vise.

PLANER AND DRILL PRESS CHUCK.

Massey's.



Fig. D. 1077.

The front jaw is adjustable to all shapes of work.

No.	Jaw, Inches.	Opens, Inches.	Weight, Pounds.	Depth of Jaw, Inches.	Price.
41	4	9½	36	1½	\$15 00
42	4	9½	42	2	17 00
43	5	11½	65	1½	20 00
44	5	11½	75	3	25 00
46	8	9½	150	2	45 00
47	8	11½	165	2	47 00
48	8	13½	176	2	49 00
49	8	15½	195	2	51 00
50	8	9	165	3	47 00
51	8	11	178	3	49 00
52	8	13	191	3	51 00
53	8	15	200	3	53 00

Discount.....



Fig. D. 1078.

LATHE DOGS.
HEAVY STEEL DOGS WITH STEEL SCREW.
U. S. Standard. Points Hardened.

No.	Inch.	Price.	No.	Inch.	Price.
1	$\frac{3}{4}$	\$0 40	14	2 $\frac{1}{2}$	\$1 45
2	$\frac{1}{2}$	50	15	3	1 60
3	$\frac{3}{8}$	60	16	3 $\frac{1}{2}$	1 80
4	$\frac{3}{8}$	60	17	4	2 10
5	$\frac{3}{8}$	70	18	4 $\frac{1}{2}$	2 75
6	1	70	19		3 25
7	1 $\frac{1}{4}$	80	Full Set of 19.....\$23 60		
8	1 $\frac{1}{2}$	80	No. 20 (extra), 5 $\frac{1}{2}$ in. 4 00		
9	1 $\frac{3}{4}$	95	No. 21 (extra), 6 in... 5 00		
10	1 $\frac{3}{4}$	95	One Small Set of 8,		
11	1 $\frac{3}{4}$	1 10	by $\frac{1}{4}$ to 2 Inches.. 6 25		
12	2	1 20	One Small Set of 12,		
13	2 $\frac{1}{2}$	1 35	by $\frac{1}{4}$ to 2 Inches,		
			Continued by $\frac{1}{2}$		
			inch to 4 Inches.. 13 20		

This Dog has a very heavy Boss, so that if the thread wears, a heavier screw can be substituted.

When ordering, state as above, whether a full set, or a set of 12, or a small set of 8 is wanted.

To make a straight-tailed Dog, heat it to a bright red and straighten on the anvil; do not make it any hotter.

Discount.....

LIGHT STEEL DOGS.
Hardened Steel Screw.

No.	Inch.	Price.	No.	Inch.	Price.	No.	Inch.	Price.
1	$\frac{3}{4}$	\$0 35	5	1 $\frac{1}{4}$	\$0 75	9	2 $\frac{1}{2}$	\$1 40
2	$\frac{1}{2}$	35	6	1 $\frac{1}{2}$	85	10	3	1 50
3	$\frac{3}{8}$	50	7	1 $\frac{3}{4}$	1 00	11	3 $\frac{1}{2}$	1 70
4	1	60	8	2	1 10	12	4	1 90

Discount.....

MALLEABLE IRON.
With Steel Screws. U. S. Standard. Points Hardened.

No.	Inch.	Price.	No.	Inch.	Price.	No.	Inch.	Price.
1	$\frac{3}{4}$	\$0 30	5	1 $\frac{1}{4}$	\$0 60	9	2 $\frac{1}{2}$	\$1 20
2	$\frac{1}{2}$	30	6	1 $\frac{1}{2}$	60	10	3	1 30
3	$\frac{3}{8}$	40	7	1 $\frac{3}{4}$	90	11	3 $\frac{1}{2}$	1 40
4	1	40	8	2	1 00	12	4	1 60

Small Set of 8, \$4.50. Full Set of 12, \$10.00.

Discount.....

LATHE DOGS.

Drop-Forged.



Fig. D. 1079.

No.	Size Dog, Inches.	Screw.		Price.	
		Diam., Inches.	Length, Inches.	Dogs, Each.	Extra Screws, Each.
1	$\frac{3}{8}$	$\frac{5}{16}$	$1\frac{1}{4}$	\$0 40	\$0 06
2	$\frac{7}{16}$	$\frac{1}{8}$	$1\frac{1}{2}$	50	07
3	$\frac{1}{2}$	$\frac{1}{8}$	$1\frac{3}{4}$	60	08
4	1	$\frac{1}{4}$	2	70	09
5	$1\frac{1}{4}$	$\frac{1}{4}$	$2\frac{1}{4}$	85	09
6	$1\frac{1}{2}$	$\frac{1}{4}$	$2\frac{3}{4}$	1 00	10
7	$1\frac{3}{4}$	$\frac{1}{4}$	$2\frac{3}{4}$	1 20	12
8	2	$\frac{1}{4}$	$2\frac{3}{4}$	1 40	16
9	$2\frac{1}{2}$	$\frac{1}{4}$	3	1 70	16
10	3	$\frac{3}{8}$	$3\frac{1}{4}$	2 10	22
11	$3\frac{1}{2}$	$\frac{3}{8}$	$3\frac{1}{4}$	2 60	30
12	4	$\frac{3}{8}$	$3\frac{3}{4}$	3 30	30
13	5	1	$4\frac{1}{2}$	6 00	50

These are drop-forged from steel, which gives the greatest strength and toughness of material for the least weight.

The screws, threaded U. S. Standard, are made of a special grade of steel well adapted to the purpose, and are hardened and tempered.

Discount.....

Drop-Forged Lathe Dogs.

Extra Heavy, with Bent Tail and Two Screws.

Further security in fastening has been attained by making our heavy dogs, in the three largest sizes, with two screws each. High speed and heavy cut requirements are surpassingly well cared for in this type of forging.



Fig. D. 1080.

No.	Size Dog, Inches.	Screw.		Price.	
		Diam., Inches.	Length, Inches.	Dogs, Each.	Extra Screws, Each.
12A	4	$\frac{7}{8}$	$3\frac{1}{2}$	\$5 00	\$0 30
13A	5	1	$4\frac{1}{2}$	9 00	50
14A	6	1	$5\frac{1}{2}$	14 00	65

Discount.....

STEEL DOG WRENCH.



Fig. D. 1081.

Fitting screw heads from $\frac{3}{4}$ to $\frac{1}{2}$ inch square. Will answer for both dogs and tool post.

Price..... Per doz. \$12 00

Discount.....

CLAMP DOGS.

No.	Opens Inches.	Price Each.	No.	Opens Inches.	Price Each.
1	1	\$1 00	5	4	\$2 75
2	1½	1 10	6	5	3 25
3	2	1 30	7	6	4 00
4	3	1 60			

Discount.....

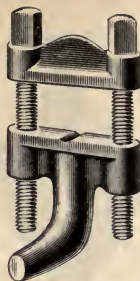


Fig. D. 1082.

CLAMPS.

Heavy Steel.

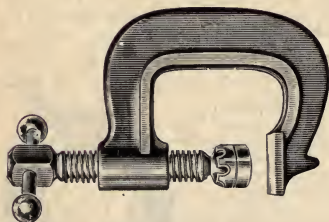


Fig. D. 1083.

No.	Capacity.	Price.
1	Opening to 2 inch.	\$1 75
2	Opening to 3 inch.	2 00
3	Opening to 4 inch.	2 25
4	Opening to 5 inch.	2 50
5	Opening to 6 inch.	2 75
6	Opening to 8 inch.	3 25
7	Opening to 10 inch.	3 75
8	Opening to 12 inch.	4 25
9	Opening to 14 inch.	5 00
10	Opening to 16 inch.	6 00
11	Opening to 18 inch.	7 00

Discount.....

Extra Heavy Boiler.

No.	Size.	Price. Each.
1	2 inch	\$ 3 00
2	3 "	4 00
3	4 "	5 00
4	5 "	6 00
5	6 "	7 50
6	8 "	8 50
7	10 "	10 00

Discount.....

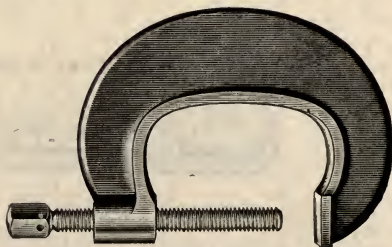


Fig. D. 1084.

FLEXIBLE SHAFT.

The Gem.

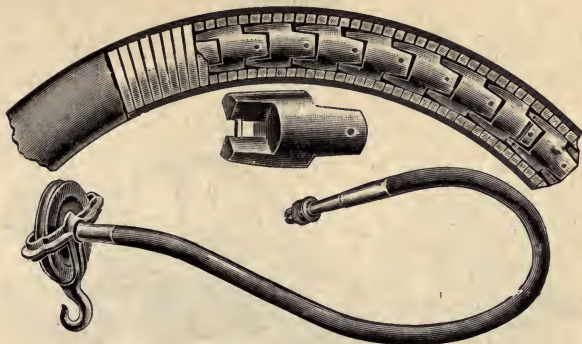


Fig. D. 1085.

The core is composed of segments made of gun metal, encased in square steel wire made and tempered especially for this specific purpose, that in turn is covered in leather or specially prepared rubber, warranted to withstand 350 degrees of heat and to be unaffected by the soft grease used in lubricating the core.

It is capable of being run in both directions, delivering the maximum power, and in any length of sections up to eight feet; the parts being interchangeable, the sections can be coupled together, making a shaft of much greater length than can be procured any other way. The segments are of such contour that they are neither affected by nor do they affect the slight opening formed on the one side of the wire casing, in rounding a curve.

The shaft should be kept thoroughly lubricated, being greased not less than twice a day, where it is kept running steadily, the most convenient method of doing this being to remove the end fittings and withdraw the core into a trough and apply the soft grease by hand. The effect of this treatment will be to greatly increase the life of the Shaft.

In case of accident a broken segment can be easily replaced and repairs completed at the place the Shaft is in use, doing away with the necessity of sending the Shaft to the factory.

Back lashing has been eliminated.

No.	3	4	4½	5	6	8	9
Diam. of core, inches	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1½	1¾
Length of shaft, feet.	5	6	7	7	8	8	8
Weight complete, lbs.	10	18	25	30	35	60	80
Price complete,	\$30 00	40 00	45 00	50 00	60 00	80 00	100 00
Extra length, per ft. . .	3 00	3 75	4 00	4 50	5 25	8 25	

Be particular to state whether you wish the Shaft to run right or left hand or both directions.

For lengths shorter than standard, deduct two-thirds the "price per foot extra" from that of the standard Shaft.

When a flexible Shaft is desired of double or more the length of the standard, we would recommend the coupling of two or more shafts of standard lengths together rather than making them in one piece.

Discount

VALVE SETTING MACHINE.

Farrington's.

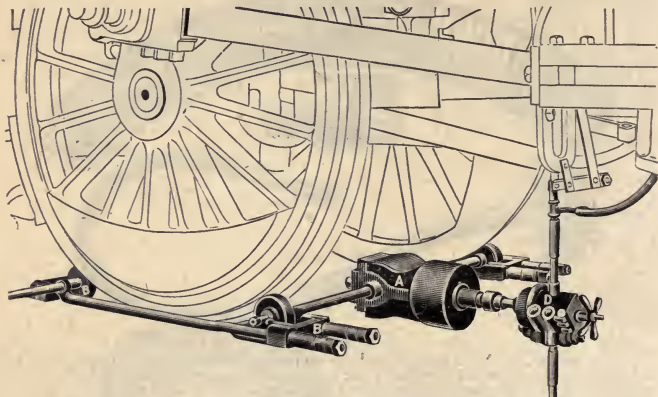


Fig. D. 1086.

With Mills' Attachment for Using Air Drill.

Which can be easily applied to Farrington's Valve-Setting Machine already in use.

The attachment A is designed to transmit power from a pneumatic drill to rotate driving wheels of a locomotive while setting eccentrics and valves. The common method heretofore has been to use a ratchet with long lever attached, the lever being operated by manual labor. With this simple, compact and efficient attachment the labor required to rotate the wheels is eliminated, and the time required to reset the valves is largely reduced, two men only being required, instead of three or more as heretofore. The device is attached to roll-shaft of Farrington's Machine B, between the driving wheels, this being the most convenient position, as the workmen required at this place to adjust the eccentrics and eccentric rods can easily operate the machine. It is reversed with the lever C, and can be reversed as easily when the drill D is in motion as when stationary. It is easily applied, and is detached from the rolls by removing two bolts, making it convenient to handle. It is accurate in stopping the driving wheels to gauge for dead centres or other points. To apply the attachment put the Farrington rolls under the wheel in the usual way, using roll-shaft for this machine on one side of wheels and roll with ratchet and lever on the other. Raise the wheels with the rolls until they move freely, then apply the machine in the most convenient position for the workmen setting the eccentrics. This depends somewhat on the design of the engine. The roll for this machine can be placed either front or back of wheels, and the attachment extended either front or back of the roll. In whatever position the machine is placed the drill should be securely fastened. When desirable, this machine can be operated by attaching it to the air reservoir of a locomotive, wherever located, when steam is on. Keep pinion gears and other parts well lubricated. This machine can be operated satisfactorily with a No. 1 Little Giant Air Drill or one of equal power.

Prices on application.

DETROIT PNEUMATIC LOCOMOTIVE TURN-TABLE MULE.

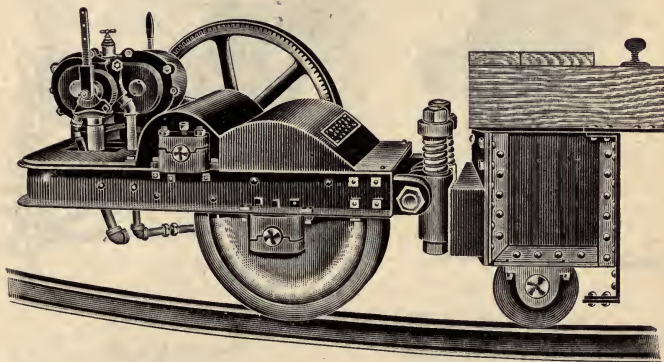


Fig. D. 1087.

You don't have to be mechanical to recognize strength, simplicity, durability and a minimum cost for maintenance in the 1909 Model Locomotive Turn-table Tractor.

Experience has produced the strongest possible construction (structural re-enforced bent frame).

Simplest construction for compactness and accessibility in making repairs, without removing the whole equipment out of the pit with a derrick.

Durability, in providing heavy gears, shafting, and bearings for hard service wear.

Economy in price and operation, a fool-proof pneumatic motor which will not freeze up in cold weather, and can be repaired in any round house. Inter-changeable for electric motor, if at some future time electric power is obtainable.

Price and detail specifications upon request.

PORTABLE FORGES.

Champion.

With Adjustable Ball Bearings.

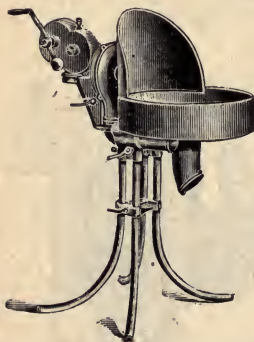


Fig. D. 1088.

Nos. 401 to 403½.

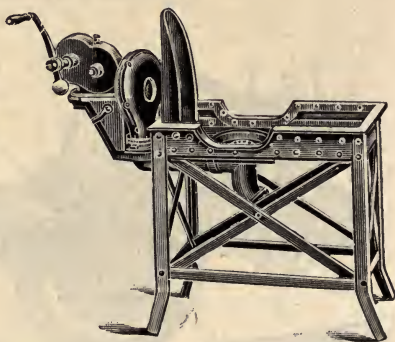


Fig. D. 1089.

Nos. 404 and 405.

The machinery is all enclosed in an oil tight casing, and entirely noiseless. It has no belts, no train of small gears or friction. It is fitted up throughout with adjustable ball bearings. It can be taken apart for transportation and again set up for use in a few minutes.

No.	STYLE FORGE.	Hearth, Inches.	Height, Inches.	Diam. Fan, Inches.	Weight, Lbs.	Price, Each.
401	Rivet, with shield.....	18	30	9	115	\$35 00
402	Tool Makers, half hood.....	18	30	9	120	38 00
403	Tool Makers, closed hood....	18	30	9	125	40 00
401½	Rivet, with shield.....	22	30	9	120	40 00
402½	Tool Makers, half hood.....	22	30	9	125	43 00
403½	Tool Makers, closed hood....	22	30	9	130	45 00
401¾	Rivet, with shield.....	24	30	10	135	45 00
402¾	Tool Makers, half hood.....	24	30	10	140	48 00
403¾	Tool Makers, closed hood....	24	30	10	145	50 00
404A	Rivet, with shield.....	18x18	30	9	125	35 00
404	Rivet, with shield.....	24x24	30	9	170	45 00
405	Tool Makers, half hood.....	24x24	30	9	180	49 00

Discount.....

L

PORTABLE FORGES.

Champion.

With Adjustable Ball Bearings.

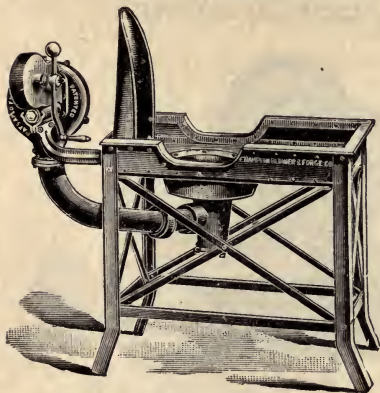


Fig. D 1090.
No. 404½.

No. 404½ with shield.	
Hearth 24x24 in.,	
height 30 in., fan 9	
in. in diameter,	
weight 185 lbs.....	\$47.50
No. 405½ with half hood,	
weight 190 lbs.....	51 50
No. 406 with shield.	
Hearth 30x30 in.,	
height 30 in., fan 10	
in. in diameter,	
weight 230 lbs.....	55.00
With water tank,	
extra.....	5 00
No. 407 with half hood,	
weight 240 lbs.....	60 00
With water tank,	
extra.....	5 00

Discount.....

BLACKSMITHS' FORGES.

Adjustable Ball Bearing.

Built especially for large, heavy, cumbersome work, at the same time entirely practical for light or medium work.

No. 408 with half hood. Hearth, 30x36 in., height 30 in., fan 12 in., complete with No. 400 "Whirlwind" Blast Tuyere Iron, weight 295 lbs....\$65 00
With water tank, extra..... 5 00

No. 409, same as No. 408, but with hearth 4 in. longer, weight 300 lbs.....\$70 00
With water tank, extra..... 5 00

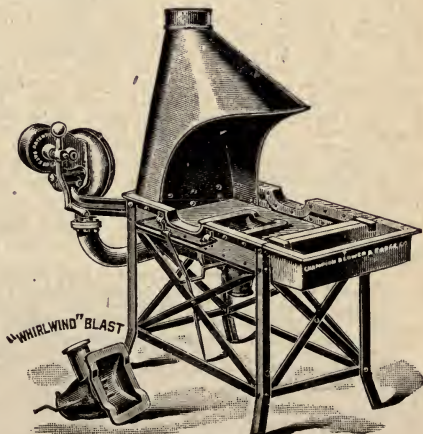


Fig D. 1091.

No. 408 Forge with Half Hood.

Discount.....

THE CHAMPION ONE-FIRE VARIABLE SPEED ELECTRIC BLACKSMITH BLOWER.

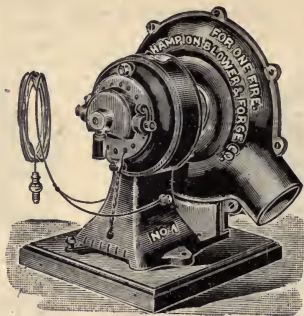


Fig. D. 1092.

No. 1.

The operator is within easy reach of the blast regulator and has entire control of the five (5) variable speeds which is easily manipulated to increase or diminish the blast according to the size of the fire wanted for the work being done, or stop the motor entirely between all heats, *which we recommend*. There is positively no waste. The fire receives the direct benefit of every revolution of the motor and fan. The No. 1 Champion "One Fire Variable Speed" Electric Blacksmith Blower can be installed to a number of individual fires in a shop for less first cost than a constant speed Electric Blower with the complete piping, elbows and blast gates required to connect the fires to the blower. The motor is of special design for either direct or alternating current. It is large and powerful with at least $\frac{1}{3}$ more capacity in motor than it is ever called on to perform. The motor shaft is of hammered steel, the bearings are of phosphor bronze and self aligning. Its finely ground journal bearings are supplied with automatic oilers. Furnished complete with starting device ready for operation, all that is necessary for the operator to do is to make wire connection.

The following special directions must be followed when ordering the No. 1 Champion "One Fire Variable Speed" Electric Blacksmith Blower:

1st—Get your information from the plant that generates the electric current you will use.

2nd—Find if the current is direct or alternating.

3rd—If direct it is necessary that you find the voltage only.

4th—If alternating, you must find cycles or alternations, phase and voltage.

5th—60 cycles or 7200 alternations furnished regularly.

6th—Both currents can be furnished regularly for either 110 or 220 volts.

7th—Other cycles or voltages are special and require correspondence.

We guarantee the consumption of electricity to run this motor not to be over 50 to 75 cents per month.

No. 1, Electric Blacksmith Blower with five speeds, 10 in. fan, weight 35 lbs..\$36 00

No. 1 $\frac{1}{2}$, with 12 in. fan, for extra heavy work..... 50 00

Directions for ordering motor with proper current found above.

Discount.....

PORTABLE FORGES.

Champion.
Electrical Driven.



Fig. D. 1093.

No. 440.

No. 440. Champion Electric Driven Blacksmith Steel Forge represents the No. 33 Champion Stationary Blast Forge supplied with the Champion Patented "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron with the No. 1 Champion Variable Speed Electric Blower attached, shown and described on opposite page, making it a most complete and practical electrical blacksmith outfit.

For electrical instructions please refer to instructions given for the No. 1 Champion Variable Speed Electric Blower on opposite page.

No. 440. Champion Electric Driven Blacksmith Steel Forge with "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron, hearth 30x36 inches, height 30 inches, with hood complete, weight 300 lbs.....\$67 00

With water tank, extra..... 5 00

No. 441. Electric Driven Blacksmith *Cast Iron Forge*, with "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron, hearth 32x45 in., height 30 in., with hood and slope bottom coal box complete. Weight 360 lbs.. 60 00

With water tank, extra..... 5 00

Discount.....

THE CHAMPION DIRECT-CONNECTED ELECTRIC BLOWERS.

Champion Direct-Connected Electric Blowers are regularly manufactured in two sizes, representing Nos. 2 and 4 Fan Blowers. The motor shafts and bearings, etc., are also of equally large dimensions. The increased size in the motors not only does its respective work with greater ease, but saves at least 10 per cent in the cost of electric current.

The number of forge fires given in the table below can only be considered as a guide to go by, as it all depends on the size of the fires wanted, and in what location the blower as well as the forges are placed. The best results are obtained when the blower is close to the fires and elbows or especially short turns are avoided.

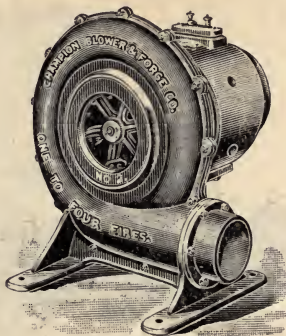


Fig. D. 1094.

No. of Blower.	Height in Inches.	Inside Diameter of Inlet.	Inside Diameter of Outlet.	No. of Forge Fires.	Phase.	Cycles.	Alternations.	Volts, Direct and Alternating Currents.	Price, Direct Current.	Price, Alternating Current.
2	15	5½	3¾	1 to 4	Single	60	7200	110 or 220	\$ 55 00	\$ 55 00
4	25½	7½	7¾	1 to 9	2 or 3	60	7200	200 or 400	115 00	115 00

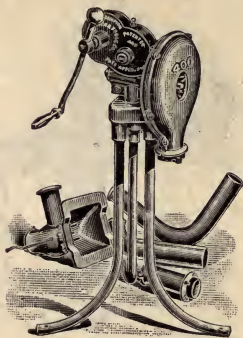
3½ in. Blast Gate, the size required for blacksmith fires.....\$1 50

Discount.....

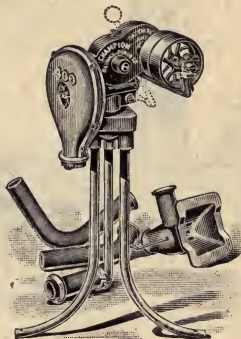
All of the Champion Electric Blowers are furnished complete with starting devices where required. Directions for ordering a blower driven by electricity: Understand that two distinctly different currents are supplied by all electric plants, and therefore, a purchaser must get the following information from the plant that generates the electric current: 1st.—Find if the current is direct or alternating. 2nd.—If direct current, it is necessary that you find the voltage only. 3rd.—If alternating current, you must find cycles or alternations, phase and voltage. 4th.—60 cycles or 7200 alternations furnished regularly. 5th.—Both currents will be furnished regularly for either 110 or 220 volts. 6th.—Other cycles or voltages are special and require correspondence.

BLACKSMITHS' BLOWERS.

**Champion Steel Hand and Power with
Adjustable Ball Bearings.**



**Fig. D. 1095.
No. 400. Hand.**



**Fig. D. 1096.
No. 400 1/2. Hand and Power.**

The No. 400 and No. 400 1/2 Blower adjustable ball bearings are made from high-grade tool steel and phosphor bronze. Cups and cones are lathe-turned-hardened as hard as glass and then ground to the highest possible finish. Noise, less and smooth.

- No. 400. Fan, 12 in. diam., hand power, with No. 400 patented tuyere, complete with piping, weight 100 lbs. \$37 00
 No. 420. Fan, 14 in. diam., hand power, with extra heavy No. 400 patented tuyere, complete with piping, weight 170 lbs. 45 00
 No. 421. Fan, 16 in., hand power, with extra heavy No. 400 patented tuyere, complete with piping, weight 175 lbs. 48 00

No. 400 1/2. Fan, 12 in., hand and power, with No. 400 patented tuyere, complete with piping, weight 175 lbs. 48 50

With special 14 in. Fan, extra.. 8 00

With special 16 in. Fan, extra.. 11 00

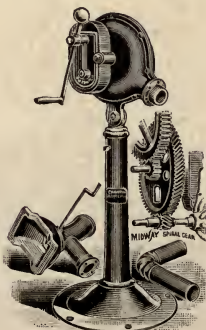
Discount.....

Midway Spiral Geared.

Simple in construction, without small gears or pinions. Gearing runs in oil in dust-proof casing, and crank turns in either direction to make the blast.

No. 70. "Midway" Spiral-gear Blower, fan 12 in. in diameter, supplied with 50 lb. center blast, heavy nest ball tuyere iron, with piping complete, weight 170 lbs. \$30 00

Discount.....



**Fig. D. 1097.
No. 70. Blower.**

PORTABLE FORGES.

Midway.

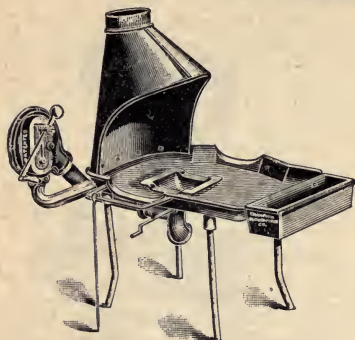


Fig. D. 1098.

No. 71 Forge with Half Hood.

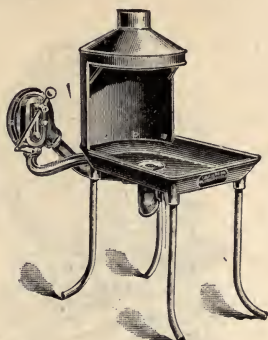


Fig. D. 1099.

No. 73 Forge with Half Hood.

Strong, durable cast-iron forges. Gearings are enclosed in dust-proof casings, and cranks turn either way to make the blast.

No. 71. Cast-iron hearth 32x45 in., height 30 in., fan 12 in. in diam., without water tank, weight 300 lbs.....	\$50 00
With Water Tank, weight 340 lbs.....	55 00
No. 72. Cast-iron hearth 23x35 in., height 30 in., fan 10 in. in diam., with shield, weight 185 lbs.....	36 00
No. 73. Same as No. 72, with half hood weight 190 lbs.....	40 00
No. 74. Same as No. 72, with full hood weight 200 lbs.....	43 00

Discount.....



Fig. D. 1100.

No. 75 Forge with Shield.

Midway.

Suitable for tank builders, boiler makers, elevated railroad contractors, etc.

No. 75. Cast-iron hearth, 22 in. in diam., height 33 in., fan 10 in. in diam., with shield, weight 140 lbs.....	\$30 00
No. 76. Same as No. 75, with half hood, weight 145 lbs....	33 00
No. 77. Same as No. 75, with full hood, weight 150 lbs.....	36 00

Discount.....

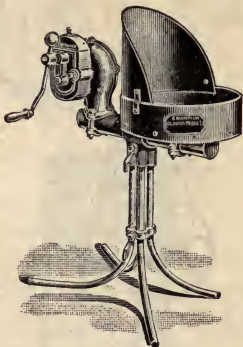


Fig. D. 1101.

No. 78.

PORTABLE FORGES.

Midway.

For bridge builders, elevated and steam railroad contractors, boiler makers, etc. A complete and practical *steel* forge. Can be knocked down for packing and set up again very quickly. Crank can be turned either way to make the blast.

No. 78. With *steel* hearth 18 inches in diameter, height 30 inches, fan 10 inches, with shield; weight 135 lbs.....\$30 00

Discount.....

BLACKSMITHS' FORGES.

Champion Lever.

The Champion Lever Forges are supplied with patented ball-joint oscillating journal bearings, requiring oiling but once in six months.

No. 1. Has the sloped coal box, the hearth is 32x45 inches, height 30 inches, fan 16 inches, weight, without water tank, 360 lbs..\$50 00

Water tank, weight 15 lbs., extra..... 5 00

Discount.....

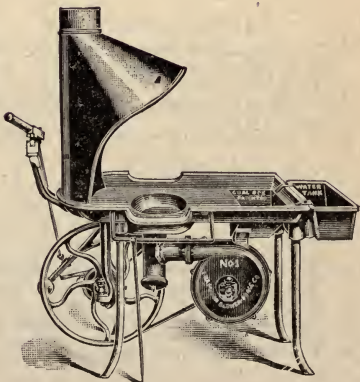


Fig. D. 1102.

No. 1. With Half Hood.

PORTABLE FORGES.

Champion Lever.



Fig. D. 1103.
No. 2.

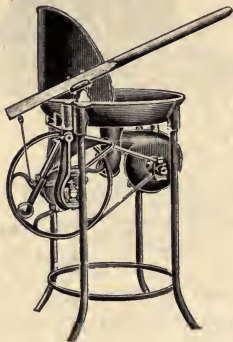


Fig. D. 1104.
No. 5.

- No. 2. With shield, hearth 23x35 inches, height 30 inches, fan 12½ inches, weight 200 lbs.....\$36 00
- No. 3. With half hood, same as No. 2. weight 210 lbs..... 40 00
- No. 4. With full hood, same as No. 2, weight 220 lbs. 42 00

Discount.....

- No. 5. With shield, hearth 22-inch diameter, height 33 inches, fan 10 inches, weight 110 lbs.....\$24 00
- No. 6. Half hood, same as No. 5, weight 115 lbs..... 27 00
- No. 7. With closed hood, same as No. 5, weight 120 lbs. 30 00

Discount.....

PORTABLE FORGES.

Champion Crank.

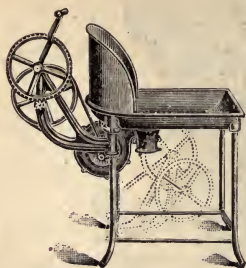


Fig. D. 1105.

No. 15, with Shield.

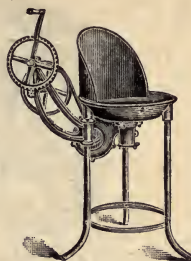


Fig. D. 1106.

No. 18, with Shield.

These forges are operated exclusively by crank motion. The crank motion on these forges delivers the blast to the fire by being turned either way. By loosening two set screws the crank and bracket gearing can be lowered and turned out of the way under the forge hearth. The fans are all large in size and are geared high enough to produce a strong blast.

No. 15.	With shield, hearth 22x28 inches, height 33 inches, fan 10 inches in diameter, weight 140 lbs.	\$29 00
No. 16.	With half hood, same as No. 15, weight 150 lbs.	33 00
No. 18.	With shield, hearth 18 inches diameter, height 33 inches, fan 9 inches in diameter, weight 100 lbs.	20 00
No. 19.	With half hood, same as No. 18, weight 110 lbs.	23 00

Discount.....

Agricultural Lever Forge.

For Light Repairing.

A cheap, well-built forge for light repair work and odd jobs. The ratchet lever motion is durable and with a reasonable amount of care will not get out of order.

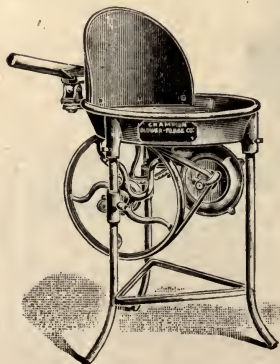


Fig. D. 1107.

No. 100, with Shield.

No.	Style.	Diam. Hearth, Inches.	Weight, Lbs.	Fan Diam., Inches.	Price.
100	With shield	22	90	9	\$16 00
101	Half hood..	22	95	9	18 00
150	With shield	18	75	8	14 00
151	Half hood..	18	80	8	16 00
152	Crank, with shield ...	18	70	8	14 00
153	Crank, half hood....	18	75	8	16 00

Discount.....

STATIONARY FORGES.

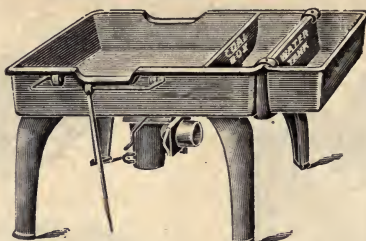


Fig. D. 1108.

These Forges are made extra heavy for all kinds of blacksmith fires; they are superior to building a Forge of brick or stone, are made for power but can be used for hand blower or bellows as well. This Forge is supplied with the Champion blast gate and whirlwind blast, anti-clinker, heavy nest tuyere iron, shown on page 589.

No. 12.	Size of hearth, over all with water tank 38x52 in., height 26 in., weight 400 lbs.	\$35 00
No. 12½.	Size of hearth, over all with water tank, 39x63 in., height 26 in., weight 480 lbs.	40 00
No. 13½.	Size of hearth, over all, with water tank, 48x73 in., height 26 in., weight 600 lbs.	70 00
	Canopy hood, extra	5 00
	Regular half hood, extra	6 25

Discount.....

BLAST GATE.

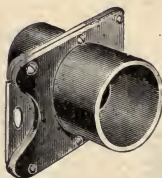


Fig. D. 1109.

2	inch iron	\$ 1 00
2½	" "	1 25
3½	" "	1 50
4½	" "	2 00
5	" "	2 25
6½	" "	2 50
8½	" "	3 50
10	" "	5 00
12	" "	6 50
14	" "	8 00
16	" "	12 00
18	" "	16 00
20	" "	18 00

The above are outside measurements

Discount.....

TUYERE IRONS.

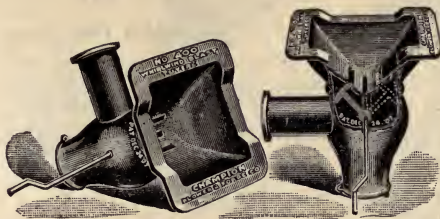


Fig. D. 1110.

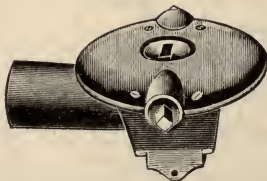
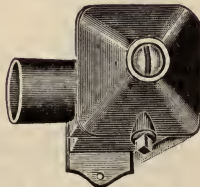
No. 400.

It has a heavy cast-iron nest into which the blast is delivered through three slots. One of these slots is in the center or bottom of the nest; the other two slots are on a 45-degree angle opposite each other above the center or bottom slot. By forcing the blast through the two-sided-angled slots, and at the same time from the center slot directly upward, creates a current of air which produces a circular-rotary-upward "Whirlwind" blast.

This Tuyere Iron is supplied with a revolving attachment for hammering the clinkers out of the side slots; therefore the slots can always be kept open without disturbing the fire from the top, assuring at all times a full capacity of draft and guaranteeing a clean and powerful fire under all conditions.

No. 400, 6 inches deep, 7 inches wide and 8 inches long, over all 12x12 inches, weight 65 lbs., price.....\$10 00

Discount.....

Fig. D. 1111.
Old Style Ball.Fig. D. 1112.
New Style Ball.

Price Ball Tuyeres (either style)..... each, \$2 00

Discount.....

BLACKSMITHS' BLOWERS.**Buffalo 200 Silent****with****Vulcan Tuyere Iron.**

12 inch No. 200 with tuyere and pipe connections.....\$37 00

Weight 150 lbs.

14 inch No. 200 with tuyere and pipe connections.....\$45 00

Weight 160 lbs.

Discount.....

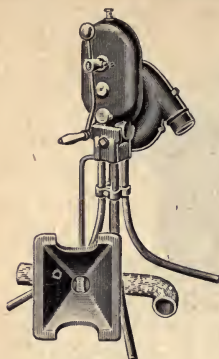
PORTABLE FORGES.**Buffalo.**

Fig. D 1113.
No. 200.

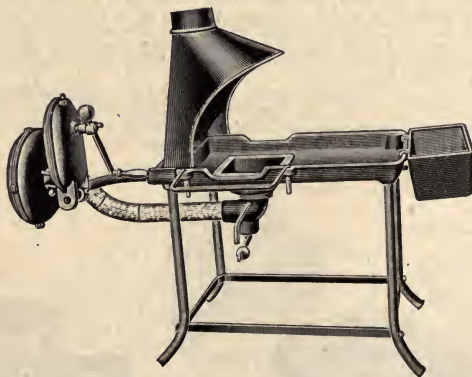


Fig. D. 1114.
No. 650.

Standard cast iron forge equipped with the 200 silent blower and the [H. H. anti-clinker self-dumping tuyere iron.
Heavy cast iron hearth, well braced.

No.	Hearth, Inches.	Weight, Pounds.	Price Complete.	Price Less Tank
650	28x40	300	\$54 00	\$50 00
651	23x30	200	44 00	40 00
671	38x42	600	90 00	85 00

Discount.....

PORTABLE FORGES.

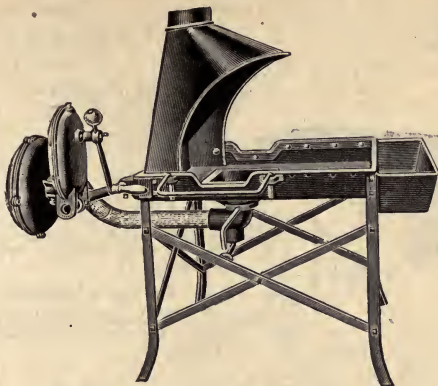


Fig. D. 1115.

No. 604 with Half Hood.

Constructed of heavy steel plate, re-enforced with angle iron and supported on well braced angle iron legs. Includes the 200 silent blower, H. H. deep fire tuyere iron and new self-closing ash gate. Capacity, 4-inch iron welding heat ten minutes.

Forge.....	600	601	602	603	604	605
Size of Fire Pan...	24x24 in.	24x24 in.	30x30 in.	30x30 in.	30x36 in.	30x40 in.
Type Hood.....	dash	$\frac{1}{2}$ hood	dash	$\frac{1}{2}$ hood	$\frac{1}{2}$ hood	$\frac{1}{2}$ hood
Weight.....	190 lbs.	195 lbs.	230 lbs.	235 lbs.	260 lbs.	265 lbs.
Price with Tank...	\$50 00	\$55 00	\$60 00	\$65 00	\$70 00	\$75 00
Without Tank.....	45 00	50 00	55 00	60 00	65 00	70 00

Discount.....

RIVET FORGE.

Buffalo.

The No. 625 series are supplied with the 200 blower and 12-inch fan. The No. 240 is equipped with spiral gear blower.

No. Forge.	625	625A	625B	626	240
Fire Pan...	18 in.	22 in.	24 in.	18 in.	18 in.
Type Hood.	dash	dash	dash	$\frac{1}{2}$ Hood	dash
Weight....	110 lbs.	120 lbs.	130 lbs.	120 lbs.	120 lbs.
Price.....	\$35 00	\$38 00	\$41 00	\$38 00	\$35 00

Discount.....

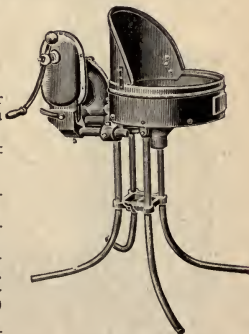
Fig. D. 1116.
No. 625.



Fig. D. 1117.
No. 0.

PORTABLE FORGES.

Lever.

No. 0.—Height, 32 in.; hearth, 28x40 in.; fan, 14 in.

Without Water Tank:
weight, 280 lbs.....\$50 00

With Water Tank:
weight, 300 lbs..... 54 00

Discount.....

It is now equipped with the H H Deep Fire, Side and Center Blast, Anti-Clinker Tuyere Iron, which makes it a more efficient forge than ever before.

For heavy blacksmith work.

Will heat 3-inch iron in five minutes or a 4-inch iron in ten minutes.



Fig. D. 1118.
No. 3

No. 1 —Half-open Hood; height, 29 in.; fan, 10 in.; hearth, 21x27 in.; weight, 150 lbs. Price.....\$40 00

No. 2.—Closed Hood; Size same as No. 1; weight 155 lbs. Price... 42 00

No. 3.—With dash. Size same as No. 1; weight, 145 lbs. Price... 36 00

Will produce welding heat on 2½ to 3-inch iron in from five to ten minutes and on heavier iron if required.

Discount.....

PORTABLE FORGES.**Lever.****Fig. D. 1119.****No. 4.**

- No. 4.—Half open hood; height, 33 inches; size of hearth, 18 inches diameter; weight, 75 pounds.....Price, \$27 00
 No. 5.—With dash, same size as No. 4; weight, 70 pounds....." 24 00
 No. 6.—Closed hood, same size as No. 4; weight, 80 pounds....." 30 00
 Will produce a welding heat on iron $1\frac{1}{2}$ in. in diameter in 5 minutes.

*Discount.....***Railroad Forge.**

- No. 10.—Same capacity as No. 5; height, to top of fire pan, 31 inches; hearth 18 inches diameter; weight, 120 lbs. Price... \$40 00
 No. 12.—Bellows Forge; practically the same as No. 10 Forge, with bellows for supplying the blast; weight, 140 lbs. Price... \$30 00

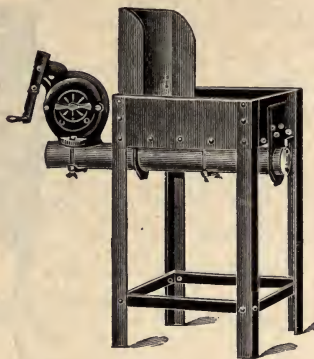
Discount.....

Nos. 10 and 12 are especially adapted for railroad repair work, iron bridge and tank builders.

Discount.....**Fig. D. 1120.****No. 10.**

PORTABLE FORGES.

Cumming.

Fig. D. 1121.
No. A.Fig. D. 1122.
No. B.

These Forges can be taken apart and put together again in two minutes easily. This makes it convenient to move from place to place.

- No. A. Forge.—With No. 1 hand blower; weight, 90 lbs.; height of basin from ground, 30 inches; basin 18 inches diameter. Price.....\$35 00
- No. B. Forge.—With No. 1 hand blower; hearth, 18 inches square; height 32 inches; weight, 135 lbs. Price.....\$40 00
- No. C. Forge.—With No. 1 hand blower; hearth, 24 inches square; weight 155 lbs.; height, 32 inches. Price.....\$45 00
This Forge is of the same general style as No. B.
- No. D. Forge.—With hand blower No. 2; size of hearth, 30 inches square; height, 30 inches; weight 220 lbs. Price.....\$75 00
- No. E. Forge.—With hand blower No. 2; size of hearth, 24 inches diameter; height 30 inches; weight, 180 lbs. Price.....\$65 00

Discount.....

Blowers.

No. 1 Blower, fan 7 inches diameter, with flange curved so as to fit over $3\frac{1}{2}$ -inch boiler tubing; it is used this way on Forges Nos. A, B and C, with a flat flange; so used on Stationary Forge. To use flat blower on $3\frac{1}{2}$ -inch tubing, an extra intermediate flange is used.

No. 2 Blower, fan 9 inches diameter, is made with flat flange. A separate flange is used when Blower is to go on 4-inch boiler tubing (see Forges Nos. D and E).

No. 1 Blower, when handle is making 30 revolutions per minute, will give a blast equal to 42-inch bellows. No. 2 Blower is equal to the largest bellows made.

Prices.

- No. 1 Blower, having flat flange, weighs 28 lbs.....\$25 00
- No. 2 Blower, flat flange, weighs 52 lbs..... 40 00

Discount.....

STEEL PRESSURE BLOWERS.

For Cupola and Forge Fires, and Other High Pressure Duty.

Buffalo.



Fig. D. 1123.

This blower has long, heavy journals in ratio of length to diameter of 6 to 1, the solid shell is cast in one piece, the bearings are in perfect alignment vertically and laterally with the rest of the machine, making it very durable and smooth running.

Number of Blower.	Diameter Of Outlet, Inches.	Diameter of Pulley, Inches.	Face of Pulley, Inches.	Price, with-out Countershaft.	Price, With Countershaft.
1.....	3½	2½	1½	\$ 12 00	\$ 20 00
2.....	4	2½	2½	18 00	28 00
3.....	4½	3	2½	26 00	38 00
4.....	5	4	3	36 00	52 00
5.....	5½	4½	3	44 00	64 00
6.....	6½	4½	3½	55 00	80 00
7.....	7½	5	4½	70 00	105 00
8.....	8½	6	4½	90 00	135 00
9.....	10	7	5	115 00	175 00
10.....	12½	8	5½	160 00	240 00
11.....	14½	8½	6½	225 00	315 00
11½.....	16½	10	7	275 00	375 00
12.....	18	10	8	325 00	435 00

Discount.....

Nos. 1 to 6 blowers, inclusive, have one pulley, and Nos. 7 to 12 have two pulleys.

Beds for Nos. 7 to 12 furnished extra.

STEEL PRESSURE BLOWERS.

For Cupola and Forge Fires, and Other High Pressure Duty.

Champion.



Fig. D. 1124.

Number of Blower.	Height, inches.	Inside Diameter of Outlet, Inches.	Diameter of Pulley, Inches.	Face of Pulley, Inches.	Price Without Counter-shaft.	Price With Counter-shaft.
1.....	12	2½	17½	1½	\$ 12 00	\$ 20 00
2.....	15	3½	2½	2	18 00	28 00
3.....	20	4½	3	2½	26 00	38 00
4.....	24	4½	3½	2½	36 00	52 00
5.....	26	5½	3½	2½	44 00	64 00
6.....	30	6½	4½	3½	55 00	80 00
7.....	35	7½	4½	3½	70 00	100 00
8.....	40	8½	5½	3½	90 00	130 00
9.....	45	10½	6	4½	115 00	165 00
10.....	53	11½	7	5½	160 00	230 00
10.....	64	13½	9	6½	225 00	315 00

Discount.....

Nos. 1 to 3 Blowers, inclusive, have one pulley, and Nos. 4 to 10 have two pulleys.

Beds for Nos. 4 to 10 furnished extra.

FAN BLOWERS.

Champion.

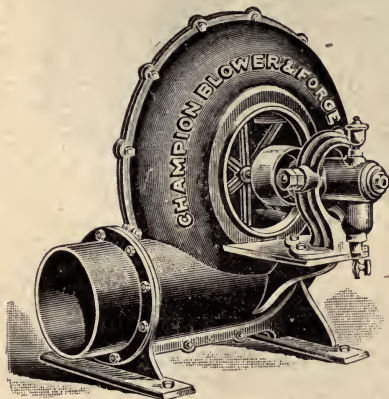


Fig. D. 1125.

number of forge fires given in table can only be considered as a guide to go by, as all depends on the size of fires wanted, and in what location the blower is placed. The best results are obtained when blower is close to the fires, and elbows, especially short turns, are avoided.

The Champion Fan Blowers are built especially for use where a large volume of blast is required (instead of great pressure). They are adapted for steam boilers, puddling and heating furnaces, dry rooms, refrigerators, forge fires, etc.; also for ventilation. They are constructed in the best possible manner, with only the highest grade material and workmanship. The journal bearings and blast wheels used on these Blowers are our Standard. Our table gives speeds for 2 and 4 oz. of blast per square inch, which meets usual requirements when a blower of full capacity is used, and blast pipes of proper area in proportion to length. 2-oz. pressure will be sufficient blast for steam boilers, etc.; also for ventilating. 4-oz. pressure with blast pipes in right proportion will give good results on puddling and heating furnaces. The

Price List with Sizes, Dimensions, Table of Speed and Capacities.

No. Blower and Exhaust Fan.	Price.	Height in inches.	Inside Diameter of Inlet.	Inside Diameter of Outlet.	Diameter of Pulley.	Face of Pulley.	No. of Forge Fires.
1/2	\$ 12 00	12	4 1/2	3 1/2	2 9/16	1 1/2	1
1	15 00	15	5	4	3	2	2
2	20 00	18	5 1/2	4 1/2	3	2 1/2	4
3	25 00	21 1/2	6 1/2	5 1/2	3 1/2	2 3/4	6
4	33 00	25 1/2	7 1/2	7 1/2	4 1/2	3 1/2	9
5	44 00	29 1/2	9	9	5 1/2	4	15
6	55 00	34	10 1/2	10 1/2	6	4 1/2	18
7	70 00	40	12	12	6 1/2	5 1/2	24
8	90 00	45	14	14	8	6 3/4	30
9	150 00	50	16	16	9	8	40
10	200 00	57	18	18	10	9	52

Discount.....

VENTILATORS.

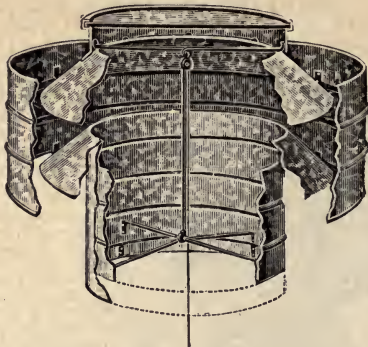


Fig. D. 1126.

A most important feature of this ventilator is that it constitutes both a skylight and a ventilator. In most cases, it makes unnecessary any other form of skylight. Owing to the condition of the weather it is sometimes advisable to close a ventilator, in which case the "Burt" can be entirely closed without in the slightest degree obstructing or affecting the light.

In other makes of ventilator in which a glass top is used, the common flat damper is employed, and when that is closed the light is wholly shut off. The top is heavy wired glass which is set in a groove and made absolutely water-tight by means of water-proof cement. We guarantee it against leaks. Below the glass top is a trough, into which runs any condensed water which may gather on the glass, whence the water passes through small holes to the outside of the ventilator.

Also made with metal top instead of glass top, when required. With the exception of the top, both styles are alike in construction and operation.

As a Chimney Cap, this ventilator is a very effective remedy for insufficient draft.

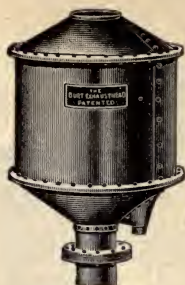
Diameter of Neck.	Gauge of Iron.	Prices.	Diameter of Neck.	Gauge of Iron.	Prices
12 inch	22	\$ 5 00	36 inch	18	\$ 37 50
14 "	22	7 50	40 "	18	50 00
16 "	22	10 00	48 "	18	60 00
18 "	20	12 50	54 "	18	70 00
20 "	20	15 00	60 "	16	80 00
24 "	20	18 00	66 "	16	90 00
30 "	18	25 00	72 "	16	100 00

Discount.....

The above prices include Glass Tops and patent sliding sleeve damper. In comparing the prices of our ventilators with those of other makes it should therefore be kept in view that our figures always include the cost of our exclusive patent sliding-sleeve damper while the prices of competing ventilators do not include the cost of any damper whatever.

We will quote prices for our ventilators equipped with metal-top instead of glass-top on request; also for ventilators built of copper. Ventilator bases are charged for extra, for which figures will be quoted on receipt of specifications.

EXHAUST PIPE HEADS.

Fig. D. 1127.
Burt.Fig. D. 1128.
Standard.

The exhaust heads shown above are devised for attaching to exhaust pipes, preventing the oil and wet steam from escaping upon roofs of buildings, also saving the water employed in the steam system, as the same water (after the cylinder oil has been removed) is used over and over again, thus obviating the use of fresh water which contains a large amount of lime and sediment, which forms a scale in the boiler and makes it harder for the heat to penetrate.

The Standard exhaust head is designed for those who prefer the utilization centrifugal force, for separating the water and oil from the exhaust steam and also for those who desire a cone-shaped exhaust head.

Heads larger than 5 inches are fitted with extra heavy companion flanges.

In ordering, state inside diameter of exhaust pipe; horse power of engine, whether or not same is over-loaded, and whether the exhaust is severe.

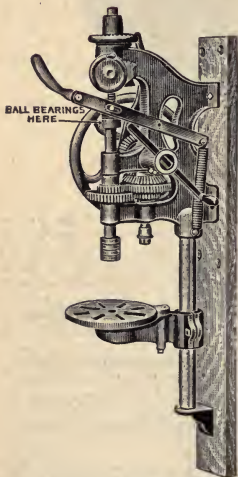
Size of Exhaust Pipe, Inches	Price Either Style, Each	Burt Exhaust Head.					Standard Exhaust Head.				
		Height, Inches.	Diameter, Inches.	Size of Drip, Inches.	Net Weight, Pounds.	Shipping Weight, Pounds.	Height, Inches.	Diameter, Inches.	Size of Drip, Inches.	Net Weight, Pounds.	Shipping Weight, Pounds.
1 or 1½	\$ 8 00	16	10	¾	18	30	21	16	¾	27	33
2 or 2½	10 00	18	12	1	18	30	27	21	1	27	33
3 or 3½	12 00	20	14	1	35	50	31	25	1	41	56
4 or 4½	16 00	27	16	1	49	65	37	30	1	62	77
5	20 00	29	18	1½	72	89	40	32	1½	70	90
6	24 00	31	20	1½	90	125	43	35	1½	102	125
7	30 00	36	22	1½	95	130	47	39	1½	127	157
8	36 00	39	24	1½	125	152	50	42	1½	190	228
9	42 00	43	26	1½	160	210	53	45	1½	225	265
10	50 00	46	30	2	182	222	57	49	2	245	290
11	50 00	46	30	2	182	222	..	..	..	..	..
12	60 00	48	32	2	270	435	64	55	2	345	375
13	70 00	51	34	2	305	470	67	58	2	375	405
14	80 00	56	36	2	385	550	71	62	2	400	490
15	94 00	59	39	2	500	659	74	65	2	460	545
16	100 00	62	42	2	559	799	77	69	2	525	620
17	108 00	69	45	3	610	840	..	..	..	..	..
18	120 00	76	48	3	700	950	85	76	3	600	720
19	132 00	79	50	3½	785	1035	..	..	..	..	..
20	144 00	82	52	3½	900	1150	95	82	3½	800	975

Discount.....

POST DRILLS.

Buffalo.

Ball Bearing.

Fig. D. 1129.
No. 96.Sure Grip Chuck.
(Enlarged Cut).Fig. D. 1130.
No. 90.
Ball Bearing Lever
Feed Drill.

Drills Nos. 94, 96, 89 and 90 are equipped for hand or power, or both. Gears machine cut. Bearings bored from solid metal. Lever and automatic feed. Two speeds. Three automatic feeds — fine, medium and coarse. Sure grip chuck. Wheel holding attachment.

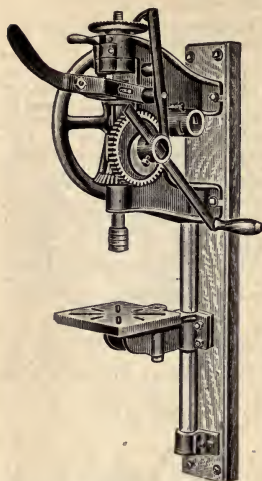
No.	Capacity, inches.	Weight, pounds.	Run of Feed, inches.	Run of Table, inches.	Price, Hand Power.	Price with Tight and Loose Pulleys.	Chucks Bored. 1/2 in. 1/4 in. or 3/8 in.
94	1 1/2-21	270	4 1/2	18	\$40 00	\$44 00	
96	1 1/2-18	245	4 1/2	18	30 00	34 00	
89	1 1/2-22	425	6 1/2	24	65 00	70 00	
90	1 1/2-22	450	5 1/2	24	55 00	60 00	

Discount.....

POST DRILLS.

Buffalo.

Ball Bearing.

Fig. D. 1131.
No. 99.Fig. D. 1132.
No. 152.

Ball bearing drill Nos. 98 and 99 equipped with lever feed, 2 speeds, quick return, 3 Automatic feeds.

Ball bearing drills Nos. 146-152, equipped with automatic feed.

No. Drill.	Capacity.	Run of Feed, Inches.	Run of Table, Inches.	Length, Over All Inches.	Weight, Lbs.	Price, Hand Power.	Price with Tight and Loose Pulley.
145	$\frac{1}{8}$ in. hole to ctr. 12 in. circle.	3 $\frac{1}{2}$	9	38	60	\$6 00	.....
146	1 in. hole to ctr. 12 in. circle.	3 $\frac{1}{2}$	9	38	70	8 00	.....
147	$1\frac{1}{8}$ in. hole to ctr. 14 in. circle.	3	13	41	80	9 00	.....
148	$1\frac{1}{4}$ in. hole to ctr. 14 in. circle.	3	13	41	35	9 50	.....
151	1 in. hole to ctr. 12 in. circle.	3	12	33	65	8 50	\$11 50
152	$1\frac{1}{4}$ in. hole to ctr. 14 in. circle.	3	12	38	80	10 00	12 00
99	$1\frac{1}{8}$ in. hole to ctr. 16 in. circle.	3	12	46	200	18 00	21 00
98	$1\frac{1}{2}$ in. hole to ctr. 18 in. circle.	3 $\frac{1}{2}$	18	46	225	25 00	29 00

Drills Nos. 145 to 152, Improved chuck. Nos. 99 and 98, Sure Grip chuck.

Discount.....

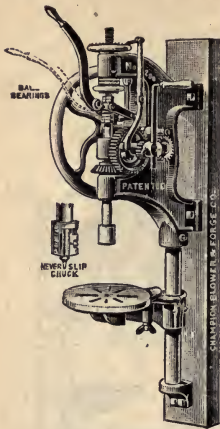


Fig. D. 1133.

No. 200. Adjustable Lever-Feed, Made with Ball Bearings Only.

No. 200 $\frac{1}{2}$. The drill bit is instantaneously raised out of the hole just bored and again returned back on the material to bore the next hole when using either feed. There is no turning backwards of the feed screw nut with either feed. The lever is adjustable and gives leverage for different work. The self-feed is the latest design, gives cutting clearance to the drill bit and bores holes in shortest time. Drills to center of an 18-inch circle. Spindle 1 $\frac{1}{2}$ inches in diameter, has an up-and-down run of 4 inches. Has two speeds which are changed from one to the other by changing the gears. Is bored like Champion "Patented" Never Slip Chuck to take in $\frac{1}{2}$ -inch straight shank drill bits, if specially ordered will be bored to take in $\frac{3}{8}$ -inch or $\frac{1}{2}$ -inch straight shank drill bits. Drills holes from 0 up to 1 $\frac{1}{2}$ inches.

No. 200 $\frac{1}{2}$. Champion Self-Feed and Lever-Feed Post Drill; drills to center of 18-in.; weight 240 lbs. \$30 00
Extra for tight and loose pulleys for power.. 4 00

Discount.....

POST DRILLS.

Champion.

Combination Automatic Self-Feed and Lever-Feed.

No. 200. All end friction is taken from the drill spindle by the use of ball bearings, making the drill easy running. Both feeds are independent of each other. The change from one to the other requires but a small fraction of a second. The adjustable lever gives the operator the advantage of more or less leverage to suit the work. This drill has double back gears, two speeds, crank on the second speed turns in the same direction as the first speed, drills to center of a 16-inch circle, spindle is 1 $\frac{1}{2}$ inches in diameter and has an up-and-down run of 4 inches. Bored like Champion "Patented" Never Slip Chuck to take in $\frac{1}{2}$ -inch straight shank bits. If specially ordered will be bored to take in $\frac{3}{8}$ -inch or $\frac{1}{2}$ -inch bits. Drills holes up to 1 $\frac{1}{2}$ inches.

No. 200. Champion Self-Feed and Lever-Feed Post Drill; drills to center of 16-in.; weight 180 lbs. \$25 00
Extra for tight and loose pulleys for power.. 3 00

Discount.....

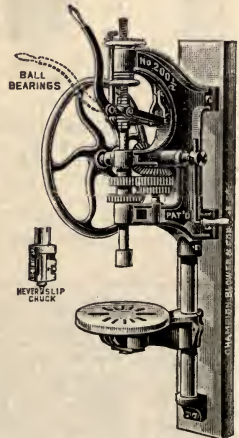


Fig. D. 1134.

No. 200 $\frac{1}{2}$. Adjustable Lever-Feed, Made with Ball Bearings Only.

POST DRILLS.

Champion.

**Combination Automatic Self-Feed and Double Compound Lever-Feed.
Made with Cut Gears and Ball Bearings.**

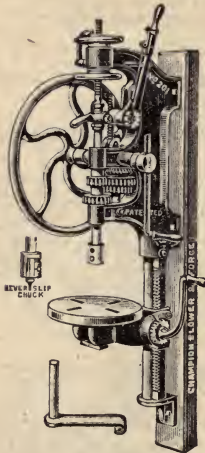


Fig. D. 1135.

**No. 201. Double
Compound Lever-Feed.**

No. 203, in addition to the features contained in the No. 201, has the fly wheel which spins on ball bearings at the bottom end of shaft. It has a rack for raising and lowering the table and wheel hanger for drilling tires. Drills to center of 21-inch circle. Spindle is $1\frac{1}{2}$ inches in diameter. Has up-and-down run of $5\frac{1}{2}$ inches. Bored like Champion "Patented" Never Slip Chuck to take in $\frac{1}{4}$ -inch straight shank drill bits; if specially ordered, bored to take in $\frac{1}{2}$ -inch straight shank bits. Will drill holes up to $1\frac{1}{2}$ inches.

No. 203. With cone pulley and counter-shaft for hand and power, weight 500 lbs.....\$65 00

No. 203. Drill with tight and loose pulleys for hand and power, weight 425 lbs..... 54 00

No. 203. Drill for hand only, weight 400 lbs..... 50 00

Discount.....

The No. 201 has machine-cut double sliding back gears which are changed in a moment for light or heavy work. All end friction is taken from the drill spindle by ball bearings, making it light running. The double compound lever invention produces 80 per cent more pressure and bores 80 per cent larger holes than lever-feed drills. Changing from one feed to the other requires but a second. The self-feed is our latest design, gives bit cutting clearance, bores holes in shortest time, less sharpening and longest life to the drill bit. It has a rack for raising and lowering the table and wheel hanger for drilling tires. Drills to the center of 21-inch circle. Spindle $1\frac{1}{2}$ inches in diameter, has an up-and-down run of $5\frac{1}{2}$ inches. Bored like Champion "Patented" Never Slip Chuck to take in $\frac{1}{4}$ -inch straight shank drill bits; if specially ordered, bored to take in $\frac{1}{2}$ -inch straight shank bits. Drills holes up to $1\frac{1}{2}$ inches.

No. 201. Weight 375 lbs.....\$40 00
Extra for tight and loose pulleys for power.. 4 00

Discount.....

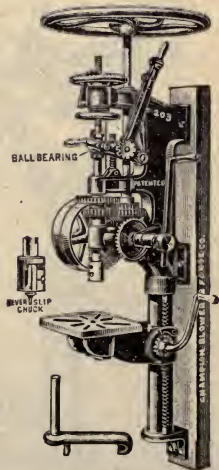


Fig. D. 1136.

**No. 203. Double
Compound Lever-Feed.**

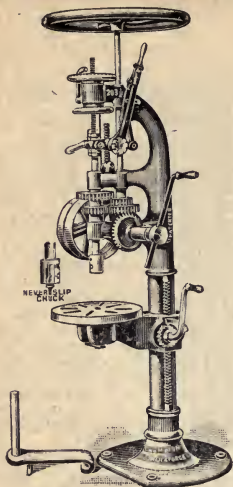


Fig. D. 1137. No. 203 1/2.

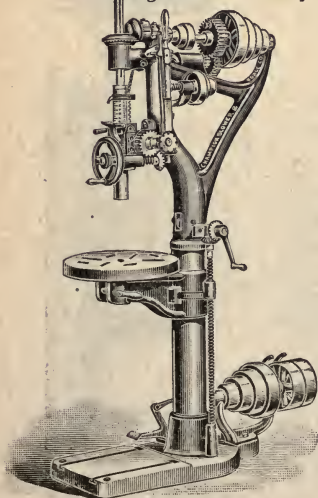


Fig. D. 1138. With Square Base.

UPRIGHT DRILLS.**Champion.**

Patented self-feed and double compound lever-feed, exactly the same as No. 203 on the preceding page, except that this drill stands on a base, and requires no post.

No. 203 1/2. Weight 600 lbs. \$70 00

No. 203 1/2. With tight and loose pulley for power and hand combined, weight 625 lbs. 75 00

No. 203 1/2. With cone pulleys and counter shaft for power and hand combined, weight 700 lbs. 85 00

Discount

20-INCH DOUBLE BACK-GEARED.**Upright Power Drill.**

This drill is designed for handling all classes of work up to 1 1/4 inches in the solid. It has eight (8) speeds and is provided with three (3) complete feeds; power feed, screw feed and hand lever-feed, thus adapting it for all classes of work from the lightest to the heaviest. It has automatic stop attachment with quick return lever giving rapid movement to the spindle. Has screw for raising and lowering the table. The change from a plain drill to a double back-geared drill is accomplished in an instant by sliding the gears.

The dimensions of this drill are as follows: drills to center of 20-inch circle. Spindle is 1 1/4 inches in diameter, with graduated sleeve, and is regularly bored with No. 4 Morse Taper. Has four-step cone pulley carrying a 2-inch belt. The pulleys for driving the drill are 8x2 1/2 inches. For ordinary drilling the pulleys should run at 300 R. P. M. Drills holes from 0 to 1 1/4 inches.

When ordering always mention when "Square Base" is wanted. "Wheel Base" will always be shipped unless otherwise ordered.

Weight 675 lbs.

Price, with square base \$130 00

With Wheel Base 120 00

Discount

ELECTRIC POWER DRILL.

The 20-inch double back-geared upright power drill is also equipped for electric power. It has an *electric motor*, furnished complete, device for starting and stopping motor. Before ordering this drill ask your electric current manufacturer whether the current is direct or alternating and the voltage. If alternating current also advise cyclage and phase.

Weight 900 lbs.

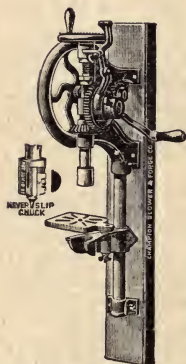
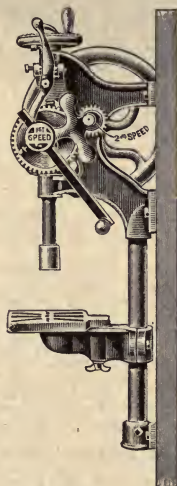
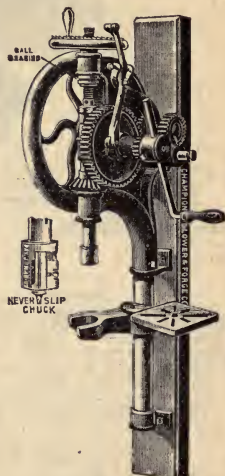
Price, direct current \$210 00

Extra for alternating current 25 00

Discount

POST DRILLS.

Champion.

Fig. D. 1139.
No. 90.Fig. D. 1140.
No. 93.Fig. D. 1141.
No. 4.

No. 90. Is back geared, with one speed. All bearings are ground out of solid metal. Has slotted lathe turned table, like all high priced drills. Drills to center of 14 $\frac{1}{2}$ -inch circle. Spindle 1 $\frac{1}{2}$ inches in diameter. Has up-and-down run of three inches. Bored like Champion "Patented" Never Slip Drill Chuck for $\frac{1}{2}$ -inch straight shank bits. If specially ordered bored for $\frac{1}{4}$ -inch bits. Drills holes up to 1 inch.

Weight 100 lbs., price each. \$8 50
Extra for Pulleys for power. 3 00

No. 93. Two speeds, automatic self feed, drills up to 1 $\frac{1}{2}$ inches to center of 15-inch circle, spindle run three inches, spindle bored for $\frac{1}{2}$ -inch drill shank can also be furnished for $\frac{3}{8}$ or $\frac{1}{4}$ shank drill.

Weight 125 lbs., price each. \$10 00
Extra for Pulleys for power. 3 00

No. 4. Improved Three-Gear Self-Feed Post Drill has back gears, two speeds, with a crank turning same direction on both speeds. It is supplied with ball bearings. Drills to center of 18-inch circle. Spindle 1 $\frac{1}{2}$ inches in diameter, up-and-down run five inches. Bored like Champion "Patented" Never Slip Drill Chuck for $\frac{1}{2}$ -inch straight shank bits, if specially ordered bored for $\frac{1}{4}$ -inch shank. Drills holes up to 1 $\frac{1}{2}$ inches.

Weight 200 lbs, price each. \$20 00
Without Ball Bearings. 17 50
Extra for Pulleys for power. 3 00

Discount.

ANVILS.

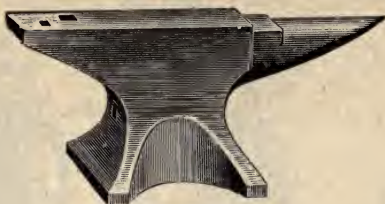


Fig. D. 1142.

Peter Wright's (Imported).	American Make (Warranted).
84 to 350 lbs., per lb. \$.....	80 to 425 lbs., per lb. \$.....
350 to 600 " "	Extras.
Extras.	426 to 625 lbs., advance $\frac{1}{2}$ cent per lb.
70 to 84 lbs., advance 1 cent per lb.	626 to 800 " " 1 " "
60 to 69 " " $1\frac{1}{2}$ " "	70 to 79 " " $1\frac{1}{2}$ " "
50 to 59 " " 2 " "	60 to 69 " " 1 " "
Under 50 " " 3 " "	50 to 59 " " 2 " "
	40 to 49 " " 3 " "
	30 to 39 " " 5 " "
	20 to 29 " " 8 " "
	10 to 19 " " 15 " "

We can furnish anvils up to 1,225 pounds, of American make.

Vulcan, Cast Iron, Steel Face, Anvils.

Nos.....	1	2	3	4	5	6	7	8	9
Weight (lbs.).	15	20	30	40	50	60	70	80	90
Price, each...	\$3 25	4 00	4 50	5 25	6 00	6 50	7 25	8 00	9 00

100 lbs. to 800 lbs., per lb., 10 cents.

Discount.....

MANDRELS OR CONE BLOCKS.

No.	Height, Inches.	Diameter at Base, Inches.	Diameter at Top, Inches.	Weight, Pounds.
1.....	32	8	1	55
$1\frac{1}{2}$	40	10	1	90
2.....	48	12	1	115
3.....	52	14	1	140
4.....	54	16	2	200

Price, per lb.....



Fig. D. 1143.

BELLOWS.

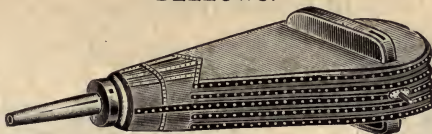


Fig. D. 1144.

Standard.

Size, inches.....	18 to 24	26	28	30	32	34
Price, each.....	\$10 00	11 00	12 00	13 00	14 00	16 00
Size, inches.....	36	38	40	42	44	
Price, each.....	\$18 00	20 00	23 00	27 00	32 00	

Discount.....

Standard, Extra Long.

Size, inches.....	24	26	28	30	32	34	36
Price, each.....	\$12 00	13 00	14 00	15 00	17 00	19 00	21 00
Size, inches.....	38	40	42	44	46	48	50
Price, each.....	\$24 00	28 00	34 00	40 00	45 00	50 00	60 00

Discount.....

SWAGE BLOCKS.

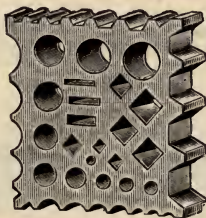


Fig. D. 1145.

No.	Dimensions.	Weight.	No.	Dimensions.	Weight.
1	3½x10 x14 in.	100 lbs.	3½	4½x16x16 in.	190 lbs.
1½	4 x12½x12½ in.	100 lbs.	4	4 x15x15 in.	165 lbs.
2	3½x11 x15 in.	125 lbs.	4½	4½x18x18 in.	255 lbs.
2½	4 x15 x15 in.	160 lbs.	5	6 x24x24 in.	675 lbs.
3	4½x11 x15 in.	145 lbs.			

Price per lb., \$.

BLACKSMITH TOOLS.

Swedges.



Fig. D. 1146.
Top.

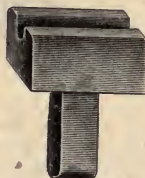


Fig. D. 1147.
Bottom.

All Sizes.....per lb., 42c.

Set Hammers.



Fig. D. 1148.

Flatters.

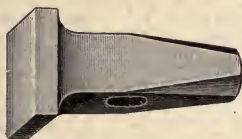


Fig. D. 1149.

1½ to 2 in., by eighths.....per lb., 42c. 2 to 4 in., by quarters..per lb., 42c

Chisels.

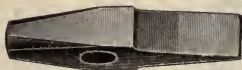


Fig. D. 1150.
Hot.



Fig. D. 1151.
Cold.

Blacksmiths' Hot and Cold Chisels.

Sizes of Square. inch	1	1½	1½	1½	1½	1½
Price	per lb., 42c.					

Discount.....

BLACKSMITHS' TOOLS.

Hardies.



Fig. D. 1152.

$\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{7}{8}$, 1, $1\frac{1}{8}$ and $1\frac{1}{4}$ -inch
Shanks.....per lb., 42c

Fullers.

Fig. D. 1153.
Top.Fig. D. 1154.
Bottom.

All sizes.....per lb., 42c

Punches.

Fig. D. 1155.
Backing Out.

Weight, about $2\frac{1}{2}$ lbs. Per lb....\$0.42

Fig. D. 1156.
Center.

Price, per lb.....\$0.42

Discount.....

Fig. D. 1157.
Square.Fig. D. 1158.
Round.

Sizes of point, inch..... $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{7}{16}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ $\frac{7}{8}$ 1
Price.....per lb., 42c

Discount.....

BLACKSMITHS' TOOLS.**Heading Tool.**

Fig. D. 1159.

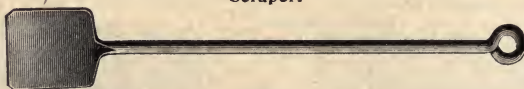
Sizes of hole, inches.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	
Price.....										per lb., 42c

FIRE SET.

Poker.



Scraper.



Shovel.

Fig. D. 1160.

Weight 5 lbs. Price per set..... \$1 75

Discount.....

Tongs.

Fig. D. 1161.

Straight Lip.

Length....inches.	14	16	18	20	22	24	26	28	30	
Price.....										per lb., 25c

Discount.....



Fig. D. 1162.

Curved Lip, Fluted Jaw.

Size.....inches.	14	16	18	20	22	24	26	28	30	
Price.....										per lb., 25c

Discount.....

BLACKSMITHS' TOOLS.

Tongs.



Fig. D. 1163.

Single Pick-up.

Length, 22 inches. Price.....per lb., 25c

Discount.....



Fig. D. 1164.

Pick.

For holding picks while being sharpened.

Length, 22 inches. Weight 4 lbs.....per lb., 25c

Discount.....



Fig. D. 1165.

Bolt.

Price.....per lb., 25c

Discount.....



Fig. D. 1166.

Gad.

Length.....inches	18	20	22	24
Holds.....	$\frac{1}{2}$ and $\frac{1}{8}$	$\frac{3}{4}$ and $\frac{1}{2}$	$\frac{1}{2}$ and $\frac{1}{4}$	$\frac{1}{2}$ to $1\frac{1}{2}$
Price.....	per lb., 25c			

Discount.....

VERTICAL HIGH SPEED AIR COMPRESSORS.

All good for 100 lbs. working pressure.

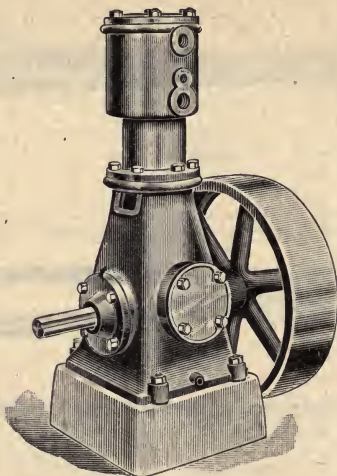


Fig. D. 1167.

Style.	Diameter.	Stroke.	Normal Speed.			Size of Pipes, Inches.			With Tight Pulley Only.		
			Revolutions per Minute.	Displacement in cubic feet free air per minute.	Horse Power Required.	Suction.	Discharge.	Water Jacket.	Shipping Weight, Pounds.	Diameter of Pulley, Inches.	Width of Pulley, Inches.
Single.....	1	2½	550	1.9	1½	1	1½	1	95	3½	1½
Single.....	3	3	300	5.8	1½	1	1½	1	250	14	2
Single.....	4	4	250	12	2	1	1½	1	400	22	3
Duplex.....	4	4	250	24	5	2	1½	1	600	22	3
Triplex.....	4	4	250	36	8	2½	2	1½	750	26	4

We can also furnish prices on larger sizes, both Steam and Belt Driven, in Single and Duplex, in Horizontal Type Machines.

Automatic Unloading Devices can be furnished at a slight additional cost, for throwing off the load when the proper air pressure has been reached.

Prices upon application.

AIR COMPRESSORS.

Stationary or Portable.

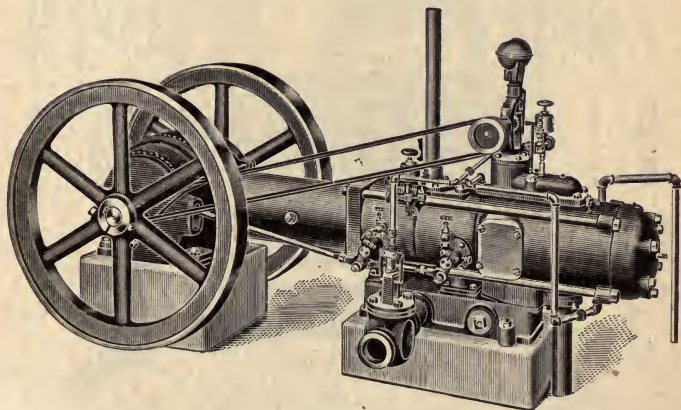


Fig. D. 1168.

Gasoline Engine Driven—Type H. S. G.

Steam, Belt, Gasoline Engine and Electric Motor Driven.

For Every Purpose and Every Pressure.

Self-Oiling and equipped with Mechanically Actuated Intake Valves. Capacities 70, 105 and 150 cubic feet free air per minute.

This type can also be furnished with Receiver, mounted on wheels, as an independent outfit.

Prices upon application.

PNEUMATIC TOOLS.**Boyer Long Stroke Riveting Hammer.**

Fig. D. 1169.

Size.	Length of Stroke, Inches.	Cubic feet free air, per minute.	Work Adapted to.	Weight of Tool, Pounds.	Length of Tool, Inches.	Approximate No. Blows per minute.	Size Hose Connections, Inches.
			Driving Rivets up to.				
90	9	25	1½ inches diameter.....	25	23½	620	
80	8	25	1 inches diameter.....	24	22½	700	
60	6	25	¾ inches diameter.....	22	20	760	
00	9	25	1 inches diameter.....	24	23	840	
50	5	25	¾ inches diameter.....	19½	18	1000	
40	4	20	⅝ inches diameter.....	14	17	1080	

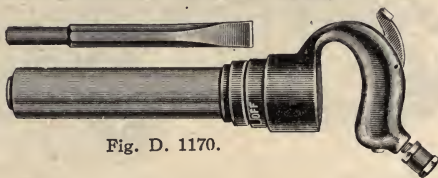
Boyer Chipping, Calking and Beading.

Fig. D. 1170.

			Work Adapted to.				
0	5	20	Extra heavy chipping and calking.....	16½	18½	840	¾
1	4	20	Heavy chipping and calking.....	13	15	1080	½
2	3	20	Medium chipping and calking.....	11	13	1500	½
3	1½	15	Light chipping and calking and flue beading...	10½	12	2000	½
A	3	20	Heavy chipping and calking.....	13	15	1860	½
B	2	15	Medium chipping and calking.....	11½	12½	2700	½
BB	1½	12	Light chipping and calking.....	8½	11½	2800	½

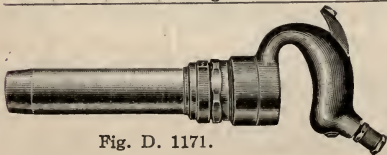


Fig. D. 1171.

Chipping Hammer in a range of sizes suitable for light chipping and calking, to the heaviest chipping possible; also for heading small hot or cold rivets.

Prices on application.

PNEUMATIC TOOLS.

Boyer Long Holder-on.

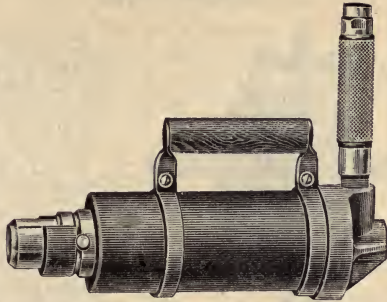


Fig. D. 1172.

Diameter of Piston.....	3 $\frac{1}{2}$ in.
Stroke of Piston.....	4 " "
Shortest Length over all, including set.....	15 $\frac{3}{4}$ " "
Size Hose connections.....	1 $\frac{1}{2}$ " "
Distance from center of rivet set to side of holder-on.....	1 " "

A variety of sizes to suit all conditions.

Boyer Rivet Buster.

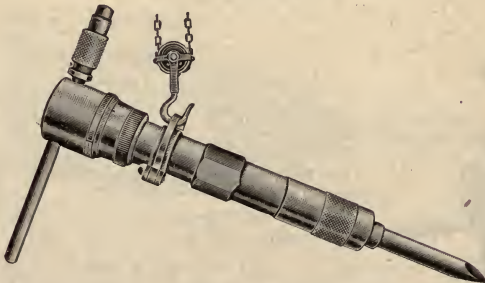


Fig. D. 1173.

No. 2. Size 2 $\frac{1}{4}$ inches x 12-inch stroke, for cutting off rivets up to 1 $\frac{1}{2}$ inch diameter.

We can furnish No. 1 size, 1 $\frac{1}{2}$ inches x 9-inch stroke, for cutting off rivets up to $\frac{7}{8}$ inch diameter.

Prices upon application.

PNEUMATIC TOOLS.

Little Giant Reversible Drills.

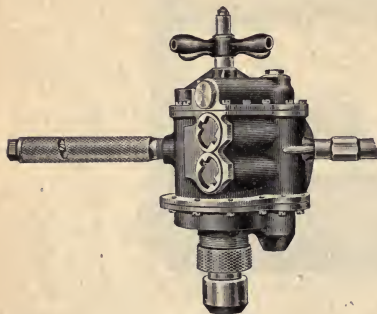


Fig. D. 1174.

No. E.—Weight, 55 pounds
Adapted for boring cylinders
and extra heavy drilling, ream-
ing and tapping. Fitted with
No. 4 Morse Taper Socket and
 $\frac{7}{8}$ -inch square tap socket.
No. 5 Morse Taper Socket fur-
nished when specially ordered.

No. D.—Weight, 35 pounds.
Adapted for drilling up to 2
inches and reaming and tap-
ping up to $1\frac{1}{4}$ inches in diam-
eter. Fitted with No. 4 Morse
Taper Socket.

No. C.—Weight, 25 pounds.
Adapted for drilling up to $1\frac{1}{4}$
inches and reaming and tap-
ping up to 1-inch in diameter.
Fitted with No. 3 Morse Taper
Socket.

Reversible.

Nos. E R, D R and C R, having similar capacities to Nos. E, D and C respectively, as shown above.

By turning a lever, machine is made reversible for rolling flues, etc.

The No. E R machine will roll 4-inch flues, which has never before been successfully accomplished with an air drill.



Fig. D. 1175.

Non-reversible.

No. A C Drill.

Weight, 10 pounds. Adapted for drilling up to $\frac{1}{2}$ inch in diameter.

Fitted with No. 0 Standard Chuck.

No. 1 Morse Taper Socket furnished when specially ordered

Runs at two speeds and can be fitted with breast plate when desired.

No. B Drill.

Weight, 15 pounds. Adapted for drilling up to $\frac{1}{2}$ inch in diameter and grinding steam pipe joints.
Fitted with No. 2 Morse Taper Socket.

Prices upon application.

PNEUMATIC TOOLS.

Little Giant Wood Boring Machines.

No. A C W Machine.

Weight, 10 pounds. Adapted for boring up to 1 inch in diameter in any kind of wood. This is the same machine previously described among the non-reversible drills and when used as a wood-boring machine, it requires simply the addition of a grip handle and chuck.

No. B W Machine.

Weight, 14 pounds. Adapted for boring up to 2 inches in diameter to any depth, in all kinds of wood.

No. C W Machine.

Weight, 25 pounds. Adapted for boring up to 4 inches in diameter to any depth, in all kinds of wood.

The above machines are equally useful in screwing and tightening or unscrewing nuts and bolts.

They are controlled by a grip handle and by turning same either to right or left they run in the corresponding direction. They can be reversed and instantly withdrawn while running at full speed.

Fitted with chuck adapted for $\frac{1}{2}$ -inch round shank augers.

Little Giant Close Quarter Drills.

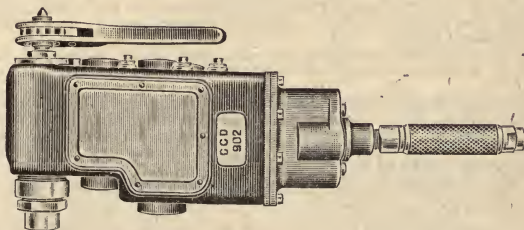


Fig. D. 1176.

No. 8.

Weight, 38 lbs.
Socket, No. 3 Morse.
Speed, 220 R. P. M.

No. 9.

Weight, 39 lbs.
Socket, No. 4 Morse.
Speed, 170 R. P. M.

Will operate to the full capacity of their respective sockets. Easy to handle. No vibration.

Prices upon application.

HEAVY DUTY PORTABLE ELECTRIC DRILLS.

For Direct Current 120-240 Volts.



Fig. D. 1177.
Size No. 3 S. S.

This entire line of tools can be furnished in the side spindle type, as shown in the cut. The No. 2, 3 and 4 drills are furnished with an extra pipe handle as shown at the right of the cut, which is removable for close corner drilling. The No. 0 and 1 drills are furnished with one handle only, on the side opposite the spindle. The No. 3 and 4 drills can be furnished with spindles in the center, if desired.

Any of the drills can be furnished with either feed screws, spade handles or breast plates, as specified, price covering only one of these items, however.

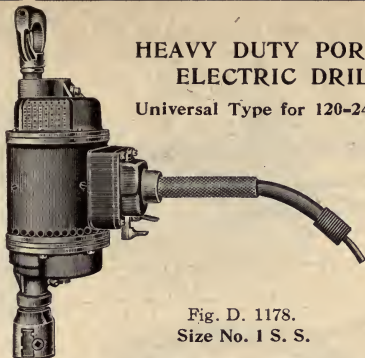
The No. 0, 1 and 2 drills are equipped with 10 feet of electrical conductor, terminating in a fusible Edison socket for adjustment to the ordinary lamp receptacle. The No. 3 and 4 drills are equipped with 15 feet of cable for connection to the customer's lines.

The tools normally wound for 120 volts will operate on circuits of from 105 to 125 volts, and those wound for 240 volts will operate on circuits of from 210 to 250 volts.

Special features of importance comprise a magnetic blow-out switch with no-voltage release effect, form wound impregnated armatures and field coils, removable covers at commutator end affording accessibility to brushes, generously proportioned bearings with large oil retaining cavities, fan providing efficient ventilation, hardened and ground steel gearing.

Heavy duty direct current electric drills, 120 and 240 volts.

Size	Capacity, Inches			Drill Socket	Speed Full Load	Weight in Lbs.		Net Price
	Drilling		Ream- ing			Net	Gross	
	Metal	Wood						
No.0 S.S.	$\frac{3}{8}$	$\frac{1}{2}$	.....	No. 0 Chuck.	700	17	28	\$ 50 00
No.1 S.S.	$\frac{1}{2}$	1	.....	No. 1 Chuck.	400	22	35	60 00
No.2 S.S.	$\frac{3}{4}$	1 $\frac{1}{2}$	$\frac{1}{8}$	No. 2 M. T..	250	31	65	85 00
No.3 S.S.	1 $\frac{1}{4}$	2 $\frac{1}{2}$	$\frac{1}{4}$	No. 3 M. T..	140	48	82	100 00
No.3 C.S.	1 $\frac{1}{4}$	2 $\frac{1}{2}$	$\frac{1}{4}$	No. 3 M. T..	140	58	95	100 00
No.4 C.S.	2	4	1 $\frac{1}{8}$	No. 4 M. T..	120	80	125	125 00
No.4 S.S.	2	4	1 $\frac{1}{8}$	No. 4 M. T.	120	75	120	125 00



HEAVY DUTY PORTABLE ELECTRIC DRILLS.

Universal Type for 120-240 Volts.

Fig. D. 1178.
Size No. 1 S. S.

These drills which are known as the Universal Type possess the unique property of being capable of operation interchangeably on direct current or on single phase alternating current of 60 cycles or less. This feature is of great value to contractors or others who have occasion to do work in various localities which may be supplied with either current. The No. 000 and No. 000X drills are supplied with breast plates only. The No. 0, 1 and 2 drills can be furnished with either feed screw, breast plate or spade handle, as desired.

Universal Electric Drills.

Size.	Capacity. Inches.		Drill, Socket.	Speed, Full Load.	Weight in Pounds.		Net Price.
	Metal.	Wood.			Net.	Gross	
No. 000 Midget.	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{1}{2}$ Inch Chuck	1500	6	10	\$35 00
No. 000X Midget.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$ Inch Chuck	700	7	12	40 00
No. 0 S. S.	$\frac{3}{8}$	$\frac{1}{2}$	No. 0 Chuck	700	17	30	55 00
No. 1 S. S.	$\frac{1}{2}$	$\frac{5}{8}$	No. 1 Chuck	400	22	41	68 00
No. 2 S. S.	$\frac{7}{8}$	1 $\frac{1}{4}$	No. 2 M. T.	250	31	65	95 00

ALTERNATING CURRENT ELECTRIC DRILLS.

For 2 or 3-Phase, 60 Cycles.

Drills of the heavy duty type, similar to those described on the previous page can be furnished for two or three phase, 60-cycle current, the same general description applying. The prices given below are for drills wound for either 120 or 240 volts, but the No. 2, 3 and 4 drills can be furnished for 440 volts, when required at an additional cost of \$5.00 for each size. It is to be understood that these drills will not operate on single phase current, but it is necessary to have two or three phase for their operation.

Size.	Capacity. Inches.		Drill, Socket.	Speed, Full Load.	Weight in Pounds.		Net Price.
	Metal.	Wood.			Net.	Gross	
No. 0 S. S.	$\frac{3}{8}$	$\frac{1}{2}$	No. 0 Chuck	600	17	30	\$ 55 00
No. 1 S. S.	$\frac{1}{2}$	1	No. 1 Chuck	450	22	41	68 00
No. 2 S. S.	$\frac{3}{4}$	1 $\frac{1}{2}$	No. 2 M. T.	315	31	65	95 00
No. 3 S. S.	1 $\frac{1}{4}$	2 $\frac{1}{2}$	No. 3 M. T.	230	48	82	112 00
No. 4 S. S.	2	3 $\frac{1}{2}$	No. 4 M. T.	185	75	120	140 00

HEAVY DUTY 600-VOLT ELECTRIC TRACK DRILLS.

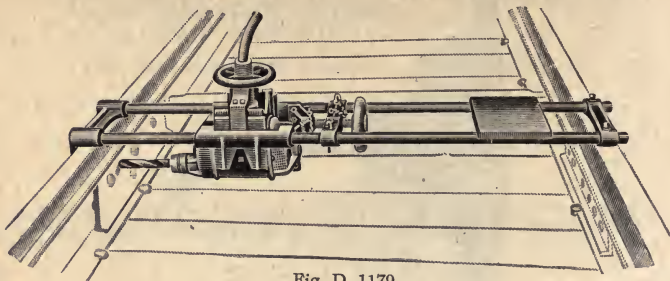


Fig. D. 1179.

No. 3, Complete.

Especially adapted for street railway circuits.

The drill shown in the cut above is built for rail bonding, drilling holes for joints or tie rods. It takes current directly from the trolley wire, and is adjustable vertically for drilling holes in any location in the work. The side spindle permits of drilling close to the ties. The drill is not clamped to the rail, but simply hooks over the rail to be drilled. The weight of the operator on the seat, shown in the cut holds down the end of the frame.

Size.	Capacity, Inches. Metal.	Drill, Socket.	Speed, Full Load.	Weight in Pounds.	
				Net.	Gross.
No. 3 Track, comp.....	1	No. 3 M. T.	150	140	240
No. 4 Track, comp.....	1½	No. 4 M. T.	130	185	300

HEAVY DUTY 600-VOLT PORTABLE DRILLS.

These drills are of the same general dimensions as those shown on Page 618, but are wound for street railway circuits. They possess all of the important features of the 120 and 240 volt drills, but are specially insulated and wound for the higher voltage and built to withstand the rough usage.

Size.	Capacity, Inches.		Drill, Socket.	Speed, Full Load.	Weight in Pounds.	
	Metal.	Wood.			Net.	Gross.
No. 1 S. S.....	$\frac{1}{8}$	1	No. 1 Chuck	400	22	35
No. 2 S. S.....	$\frac{1}{4}$	1½	No. 2 M. T.	250	30	65
No. 3 S. S.....	1½	2½	No. 3 M. T.	150	48	82
No. 3 C. S.....	1½	2½	No. 3 M. T.	150	58	95
No. 4 S. S.....	2	4	No. 4 M. T.	120	75	120
No. 4 C. S.....	2	4	No. 4 M. T.	120	75	125

PORTABLE ELECTRIC TOOLS.

For Screw Spike Driving.

We are prepared to furnish portable tools with special equipment for the rapid driving of screw spikes, illustrated on Page 70 (Fig. D. 176) of this catalogue. These tools can be built to operate direct from the trolley line, in the case of electric roads, or from a dynamo carried by a motor driven section car, in the case of steam roads. They are being used with great success for these purposes.

Prices upon application.

PORTABLE ELECTRIC GRINDERS.

For Direct and Alternating Current.

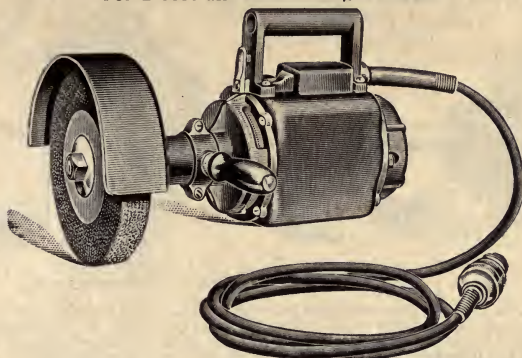


Fig. D. 1180.

Volts	Size	Emery Wheel, Inches.	Speed	Weight in lbs.		Net Price
				Net	Gross	
120 or 240	5 BP	5 x 1 1/2 x 1 1/2	4000 R.P.M.	15	30	\$45 00
120 or 240	8 BP	6 x 1 1/2 x 1 1/2	2400 "	28	48	70 00
600	8 BP	6 x 1 1/2 x 1 1/2	2400 "	28	50	80 00

Alternating Current—Two Phase—60 Cycles.

120 or 240	5 BP	5 x 1 1/2 x 1 1/2	3600 R.P.M.	15	28	\$45 00
120 or 240	8 BP	8 x 1 1/2 x 1 1/2	1800 "	28	40	70 00
440	8 BP	8 x 1 1/2 x 1 1/2	1800 "	28	45	80 00

Alternating Current—Three Phase—60 Cycles.

120 or 240	5 BP	5 x 1 1/2 x 1 1/2	3600 R.P.M.	15	28	\$45 00
120 or 240	8 BP	8 x 1 1/2 x 1 1/2	1800 "	28	40	70 00
440	8 BP	8 x 1 1/2 x 1 1/2	1800 "	28	45	80 00

TOOL POST GRINDERS.

For Direct Current Only.

These grinders can be furnished for 120 and 240 volts, direct current, but not for alternating current of any description. The No. 5 and 8 grinders are provided with shanks to fit into the tool post of the machine tools, whereas the No. 10 grinder is provided with an angle plate for bolting to the tool carriage and provision for vertical adjustment.

The No. 10 PED grinder is a stationary grinder mounted on a pedestal for general shop use, and carries only one wheel. The No. 10 BN grinder is a similar grinder, but without the pedestal, being intended for use on the bench.

Size	Emery Wheel, Inches.	Speed	Weight in Lbs.		Net Price
			Net	Gross	
5 T	5 x 3 x 1 1/2	4000 R.P.M.	14	27	\$40 00
8 T	8 x 3 x 3 1/2	2400 "	29	45	60 00
10 T	10 x 1 x 3 1/2	2000 "	70	82	85 00
10 PED	10 x 1 x 3 1/2	2000 "	200		95 00
10 BN	10 x 1 x 3 1/2	2000 "	58	75	70 00

PORTABLE ELECTRIC DRILLS.

Direct Current.

"Willey."

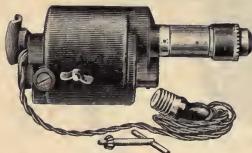


Fig. D. 1181.
No. 1.

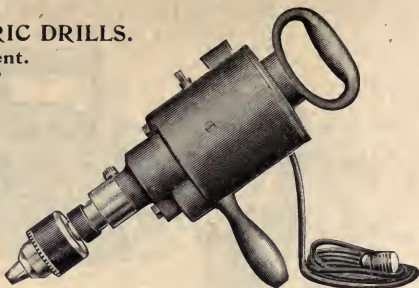


Fig. D. 1182.
No. 3—Double Speed.

No. 0 is our smallest size direct current drill. It is suitable for any work requiring many small holes to be drilled in metal or wood. It is profitably used by piano and organ makers, boat builders, automobile trimmers and for all light work. It has offset spindle, spade handle, chuck, self-contained switch and our improved terminal block for attaching the cord. Complete as shown.

Nos. 1 and 2 suitable for drilling many holes in castings and metals of all kind. They will be found to be very effective for such work and great time savers over the old hand drills. The drills are driven at much higher speed than is possible by hand, decreasing with increased pressure for larger drills.

To drill holes larger than $\frac{1}{4}$ inch with No. 3 drill, a bit with shank turned to $\frac{1}{8}$ inch must be used. Tool is complete with spade, two side handles and breast plate, furnished with taper socket for taper shank bits in place of chuck, if desired.

These portable drills will drill off center, a very great advantage when close corner work is to be done.

No. 3 drill has two speeds, the slow speed for drills of larger than $\frac{1}{4}$ inch, high speed for drills $\frac{1}{8}$ inch and smaller.

Drill body tapped opposite handle shown, so two handles can be used, with breast plate, if desired.

Dimensions.

	No. 0	No. 1	No. 2	No. 3
Will drill in hardwood up to...	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	1 in.	$1\frac{1}{2}$ in.
Will drill in cast-iron up to...	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Will drill in steel up to.....	$\frac{1}{8}$ in.	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Capacity of chuck.....	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Weight of machine including chuck.....	6 $\frac{1}{2}$ lbs.	12 lbs.	19 lbs.	21 lbs.
Length over all of machine....	9 $\frac{1}{2}$ in.	12 $\frac{1}{2}$ in.	14 $\frac{1}{2}$ in.	14 $\frac{1}{2}$ in.
Diameter of motor frame.....	4 in.	5 in.	5 $\frac{1}{2}$ in.	5 $\frac{1}{2}$ in.
Least distance from center of spindle to side of frame....	$\frac{1}{8}$ in.	.....	.....	.....
Offset of drill spindle from edge of frame.....	.....	1 $\frac{3}{8}$ in.	1 $\frac{1}{2}$ in.	1 $\frac{3}{8}$ in.
Speed approximately.....	1200 R.P.M.	1200 R.P.M.	700 R.P.M.	(Slow, 400 R.P.M. Fast, 700 R.P.M.)
Maximum horse power.....	1-10	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$

Wound for either 110 or 220 volts, direct current.

Prices upon application.

PORTABLE ELECTRICAL DRILLS.

Direct Current.

"Willey"

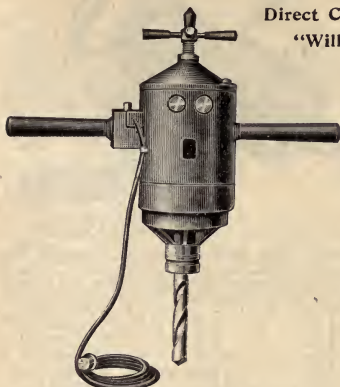


Fig. D. 1183. Nos. 4 and 5.



Fig. D. 1184. No. 6.

No. 4 drill is a comparatively light, portable drill but of sufficient power to require a screw feed when drilling to its maximum capacity. It is equipped with planetary gears and provided with two speeds. For drills larger than capacity of chuck, use turned shank drills. Handle can be removed. Two handles and breast plate furnished. Can be used with larger drills.

The No. 5 drill embodies all the general features of construction of our smaller drills, having steel frame, ball thrust, and all electrical parts completely enclosed and protected from injury. It is very much more powerful and is arranged especially for use with an "old man" for heavy work. Handles can be removed if desired. Although shown, no drill is furnished.

No. 6 is powerful, compact and comparatively light, and is designed for heavy work. All parts easily accessible and made to withstand severe service.

The motor is of the four pole-type, having a large diameter armature giving the required power without excessive speed and the attendant rapid wear and depreciation. By taking off one of the heads, any part can be removed for inspection or repair without disturbing the others. The spindle is offset for close corner drilling. Has the fewest parts and simplest arrangement of any drill made. Can be made reversible. Although shown, no drills furnished.

	No. 4.	No. 5.	No. 6.
Will drill in hard wood up to.....	2 in.	3 in.	3½ in.
Will drill in cast-iron up to.....	1 in.	1½ in.	1½ in.
Will drill in steel up to.....	¾ in.	1¼ in.	1½ in.
Length of feed.....	1½ in.	2½ in.	5 in.
No. 3 Morse taper in end of spindle...	Not furnished	Not furnished	Furnished
Weight of machine.....	24 lbs.	42 lbs.	65 lbs.
Length over all, not including drill bit	18½ in.	19 in.	18 in.
Width over all, including handles....	14 in.	22½ in.	25½ in.
Size of frame.....	5 in. diam. Empty	7½x7½ in.	7½x7½ in.
Approximate speed of spindle.....	{ 200 R. P. M. Slow 375 R. P. M. Fast	130 R. P. M.	100 R. P. M.
Maximum horse power of motor.....		½	1

Wound for either 110 or 220 volts, direct current.

Prices upon application.

PORTABLE ELECTRIC BREAST DRILLS.

Direct or Alternating Current.
"Willey"



Fig. D. 1185.
Nos. 1-U and 2-U—Single Speed.

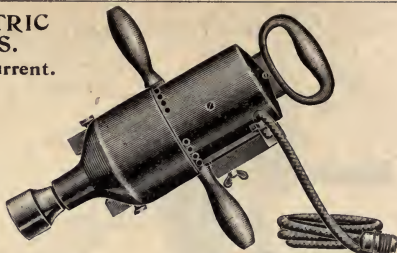


Fig. D. 1186.
No. 3-U—Two Speeds.

The No. 1-U drill is wound for 110 volts, single phase, alternating current. The Nos. 2-U and 3-U for 110 or 220 volts, single phase, alternating current. Can also be used on direct current, same voltage. Compact, powerful, light drills. Air cooled.

	No. 1-U.	No. 2-U.	No. 3-U.
Will drill in hard wood up to.....	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	1 in.
Will drill in cast iron up to.....	$\frac{1}{4}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.
Will drill in steel up to.....	$\frac{3}{16}$ in.	$\frac{1}{8}$ in.	$\frac{1}{4}$ in.
Weight of machine including chuck	6 lbs.	15 lbs.	24 lbs.
Length over all of machine.....	11 in.	16 in.	19 $\frac{1}{2}$ in.
Size of motor frame.....	3x3 in.	5 in. diam.	5 in. diam.
Speed approximately.....	1200 R.P.M.	750 R.P.M.	400 R.P.M. Slow. 700 R.P.M. Fast.

Prices upon application.

ELECTRIC CENTER GRINDER.

Without Feed.
"Willey"

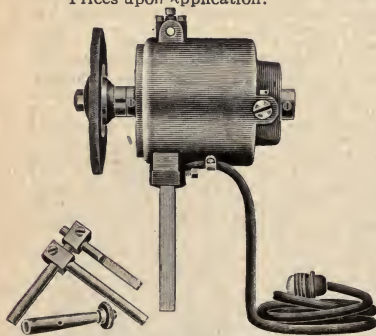


Fig. D. 1187. No. 1 $\frac{1}{2}$ -S.

In many of the modern shops a great many of the lathes have compound rests. For such shops a grinder without slide feed is cheaper and does just as well. To use this grinder, simply swivel compound rest to angle desired, clamp grinder in tool post and proceed.

All grinders are complete with wheel and internal grinding attachment as shown.

Made in three sizes. Also made with hand feed attachment.

Wound for either 110 or 220 volts, direct current.

Nos. 1 $\frac{1}{2}$ and 2 wound for two or three phase, alternating current.

	No. 1-S.	No. 1 $\frac{1}{2}$ -S.	No. 2-S.
Length of internal grinding attachment	3 $\frac{1}{2}$ in.	3 $\frac{1}{2}$ in.	3 $\frac{1}{2}$ in.
Size of wheel.....	4x $\frac{1}{2}$ x $\frac{1}{2}$ in.	6x $\frac{3}{4}$ x $\frac{1}{2}$ in.	8x $\frac{1}{2}$ x $\frac{1}{2}$ in.
Size of wheel for internal grinding.....	1x $\frac{1}{2}$ in.	1 $\frac{1}{2}$ x $\frac{1}{2}$ in.	1 $\frac{1}{2}$ x $\frac{1}{2}$ in.
Size of shank.....	$\frac{1}{2}$ x1 in.	$\frac{3}{8}$ x1 $\frac{1}{2}$ in.	$\frac{1}{2}$ x1 $\frac{1}{2}$ in.
Speed approximately.....	4500 R.P.M.	3800 R.P.M.	2800 R.P.M.
Weight of machine.....	12 lbs.	22 lbs.	45 lbs.
Dimensions of machine not including shank.....	8 $\frac{1}{2}$ x4 $\frac{1}{2}$ in.	9 $\frac{1}{2}$ x5 $\frac{1}{2}$ in.	12 $\frac{1}{2}$ x6 $\frac{1}{2}$ in.
Maximum horse power of motor.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

Prices upon application.

ELECTRIC GRINDERS

For Lathe Carriage or Tool Post.
"Willey."

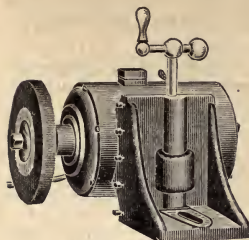


Fig. D. 1188.

Shaft large and stiff with motor completely enclosed from dirt and injury.

Furnished with either vertical or horizontal feed or with pad for tool or lathe carriage. Made in two sizes.



Fig. D. 1189.

With feed and extended shaft.

12 inch or 20 inch shaft extension.

	Figure D. 1188.		Figure D. 1189.	
	No. 1.	No. 2.	No. 1.	No. 2.
Height over all.....	12 in.	14 in.	12 in.	14 in.
Number of wheels.....	2	2	1	1
Size of wheel for external grinding.....	8x1x $\frac{1}{2}$ in.	10x1x1 in.	6x1x $\frac{1}{2}$ in.	8x1x1 in.
Size of wheel for internal grinding.....	4x1x $\frac{1}{2}$ in.	6x1x1 in.	4x1x $\frac{1}{2}$ in.	5x1x1 in.
Traverse of wheel.....	4 $\frac{1}{2}$ in.	5 $\frac{1}{2}$ in.	4 $\frac{1}{2}$ in.	5 $\frac{1}{2}$ in.
Speed approximately....	2400 RPM	2000 RPM	3000 RPM	2400 RPM
Weight of machine....	50 lbs.	75 lbs.	70 lbs.	90 lbs.
Dimension of machine.	13 $\frac{1}{2}$ x13x12 in.	16 $\frac{1}{2}$ x15x14 in.	25 $\frac{1}{2}$ x13x12 in.	27 $\frac{1}{2}$ x15x14 in.
Distance from end of frame to center of wheel	4 $\frac{1}{2}$ in.	6 in.	12 or 20 in.	12 or 20 in.
Maximum horse power.	$\frac{1}{2}$	1	$\frac{1}{2}$	1

Wound for either 110 or 220 volt direct and 2 or 3 phase alternating current.
Prices upon application.

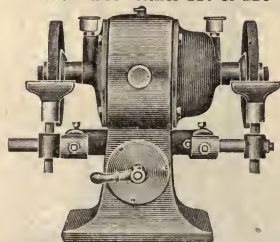


Fig. D. 1190.

Bench Grinder.

The motor is completely enclosed, with starting and stopping device conveniently located in base. Can be placed anywhere in mill or shop where current is available. Practically no cost for setting up. Can also be used as a portable grinder. A cast iron pedestal or floor stand on which to mount either grinder can be supplied if desired. Extended spindle for buffer in place of one wheel furnished.

	No. 1.	No. 2.
Height over all.....	14 $\frac{1}{2}$ in.	16 $\frac{1}{2}$ in.
Number of wheels.....	2	2
Distance between centers of wheels.....	17 $\frac{1}{2}$ in.	19 $\frac{1}{2}$ in.
Size of wheels.....	8x $\frac{1}{2}$ x $\frac{1}{2}$ in.	12x1x $\frac{1}{2}$ in.
Speed, approximately....	2400 RPM	1600 RPM
Weight of machine.....	105 lbs.	200 lbs.
Maximum horse power.....	$\frac{1}{2}$	1
Floor space.....	19 $\frac{1}{2}$ x12 in.	23 $\frac{1}{2}$ x12 $\frac{1}{2}$ in.

Wound for either 110 or 220 volts, direct and 2 or 3 phase alternating current.
Prices upon application.

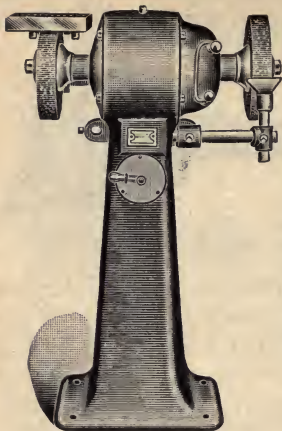


Fig. D. 1191.

ELECTRIC FLOOR GRINDER.**"Willey."**

The motor is completely enclosed from dirt or emery grindings. The motor frame and pedestal are one casting and the starter is contained in the pedestal where it is out of the way and well protected. We do not use an ordinary starter, placed on the outside or inside of frame. When desired a surface grinding attachment for one of the wheels, hoods for both wheels, or extended spindle for buffing, can be supplied.

Height over all.....	48 in.
Number of wheels.....	2
Size of wheels.....	12x2x1 in. hole
Speed approximately.....	1600 R. P. M.
Weight of machine.....	475 lbs.
Distance between wheel center	24 in.
Maximum horse power.....	2
Floor space.....	30x19 in.

Wound for either 110 or 220 volts, direct or 2 or 3-phase alternating current.
Price upon application.

**ELECTRIC COMBINATION
WET AND DRY FLOOR
GRINDER****"Willey."**

The left-hand wheel is used for dry grinding and the right hand wheel for either wet or dry.

The attachment consists of hood, splash bowl for wheel, water reservoir and settling chamber; fitted with a centrifugal pump, which is bolted to the bottom of the pedestal.

The pump is so made that no bearings are under water; furthermore it has no stuffing box. It is driven from a pulley on the wheel shaft as shown.

This attachment converts the machine into a perfect wet and dry grinder, suitable for a wide range of work.

Should it be desired to convert it into a double dry grinder, the wet attachment can be readily removed.

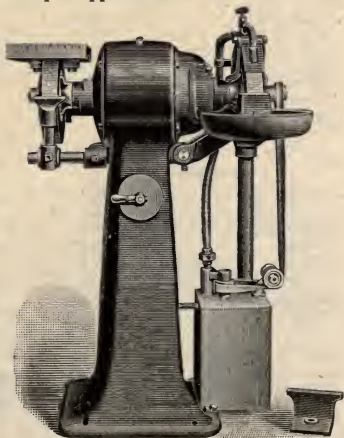


Fig. D. 1192.

Height over all.....	50 in.	Distance between wheel centers.....	24 in.
Number of wheels.....	2	Maximum horse power.....	2
Size of wheels.....	14x2x1 in.	Floor space.....	32x19 in.
Speed approximately..	1600 R. P. M.		
Weight of machine....	745 lbs.		

Wound for either 110 or 220 volts, direct or 2 or 3-phase alternating current.
Price upon application.

ELECTRIC SENSITIVE DRILLS.

"Willey."

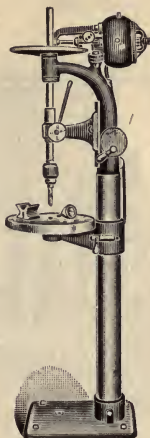
Friction Driven.

Direct Driven.

12-Inch.

Fig. D. 1193.
Bench.

16-Inch.

Fig. D. 1194.
Floor.

12-Inch.

Fig. D. 1195.
Floor.

Description of Sensitive Drills. Class.....	Friction Driven.				Direct Driven.	
	Floor.		Bench.			
	Size.....inches	12	16	12	16	12	16
Drills up to ¼-inch hole in the center of.....	12 in.	.....	12 in.	.....	.....	.....
Drills up to ⅜-inch hole in the center of.....	.....	16 in.	.....	16 in.	.....	16 in.
Drills up to ½-inch hole in the center of.....	.....	.....	.....	.....	12 in.	.....
Greatest distance, table to spindle.....	38½ in.	40½ in.	12 in.	12 in.	38 in.	41 in.
Vertical traverse of spindle...	3 in.	3 in.	3 in.	3 in.	3 in.	5 in.
Diameter of spindle in sleeve.	1½ in.	1½ in.	1½ in.	1½ in.	1½ in.	1½ in.
Diam. of spindle above sleeve..	2 in.	2 in.	2 in.	2 in.	2 in.	2 in.
Finished diameter of column..	3½ in.	4½ in.	3½ in.	4½ in.	3½ in.	4½ in.
Movement of sliding head....	8 in.	8 in.	8 in.	8 in.	.....	.....
Entire length of spindle.....	24 in.	27½ in.	24 in.	27½ in.	24 in.	27½ in.
Diameter of table.....	11½ in.	15½ in.	11½ in.	15½ in.	11½ in.	15½ in.
Height of drill with spindle up.	74½ in.	79 in.	46½ in.	47½ in.	70½ in.	81½ in.
Weight of machine.....	250 lbs.	310 lbs.	222 lbs.	280 lbs.	250 lbs.	325 lbs.
Minimum speed of drill spindle.	375RPM	300RPM	375RPM	300RPM	750RPM	240RPM
Maximum speed of drill spindle.	1000 "	850 "	1000 "	850 "	1300 "	600 "
Motor speed, approximate....	1500 "	1250 "	1500 "	1250 "	.....	.....
Maximum horse power of motor	½	½	½	½	½	1
Floor space, inches.....	23x18	30x16	21x12	30x12	14x18	22x16

Prices upon application.

ELECTRIC VACUUM CLEANERS.

Portable.

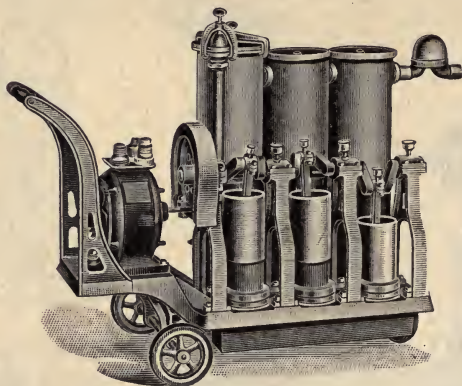


Fig. D. 1196.

Type E.

For Office Buildings, Warehouses, Stations, etc.

The Vacuum is produced by a powerful triplex direct action pump packed with heavy grease which acts as a lubricant as well as a packing and positively eliminates all wear and stops all leaks. Pumps 30 cubic feet of free air per minute.

Three dry tanks. The dust and dirt is drawn into first tank and deposited with a whirlwind movement. 97% remaining in first tank, 2 $\frac{1}{2}$ % is deposited in the second tank, while but $\frac{1}{4}$ of 1% reaches final screen in third tank.

Furnished with either direct or alternating current motor. Can be operated from the ordinary residence lighting circuit. No special wiring required.

Drive.—Encased. Very quiet and needs no lubrication.

Base.—Aluminum casting. Great strength. Light weight.

Wheels.—Aluminum casting, with heavy solid rubber tires.

Finish.—Aluminum. Very durable.

Weight.—160 lbs. complete.

Equipment.—25 feet specially constructed noncollapsible steel ribbed rubber hose. 35 feet electric cord. One observation glass, one 3-inch upholstery tool, one 5-inch portiere and stair cleaner, one 9-inch carpet renovator, one extension rod, one wall brush, one 12-inch hardwood floor cleaner and at option of purchaser one of the three following: One radiator tool, one 12-inch surface sweeper or one book cleaner. Complete instructions.

When writing for prices, please advise if for direct or alternating current.

Prices upon application.

ELECTRIC VACUUM CLEANERS.

Portable.

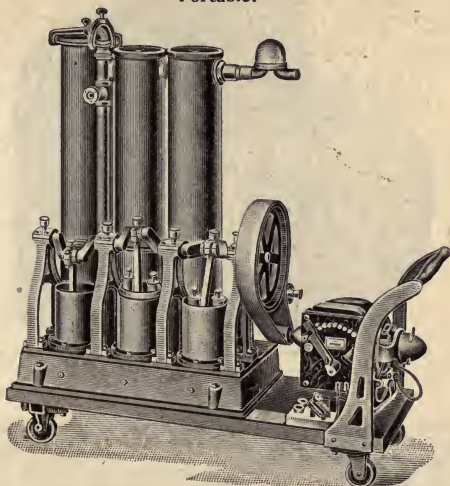


Fig. D. 1197.

Type G.

For Large Office Buildings, Coaches and Heavy Work of All Kinds.

Similar in every respect to Type E on opposite page, except that this machine is equipped with a one-horse power motor, either direct or alternating current. Special wiring required. Base and wheels are cast iron. Weight 350 pounds.

Equipped with 50 feet specially constructed non-collapsible steel ribbed rubber hose. 35 feet electric cord. One observation glass. One three inch upholstery tool. One 5-inch and one 9-inch carpet and rug tool. One extension rod. One wall brush. One 12-inch hardwood floor tool, and at option of purchaser, one of the three following: one radiator tool, one 12-inch surface sweeper or one book cleaner. Full and complete instructions in the use of tools and in care of the machine.

Also furnished without truck, for use as stationary plant.

When writing for prices, please advise if for direct or alternating current.

Prices upon application.

WASTE.



Fig. D. 1198.

We control the product of one of the largest factories in the country. Our grades are all made uniform, and parties can rely on getting same quality at any time of any of the grades mentioned below. We carry in Chicago a large stock, and can fill orders promptly for either white or colored, cotton or wool waste. Carload lots or less. We can also make direct shipments from mill to points outside of Chicago (where a more favorable freight rate would be advantageous to our customers). Samples on application.

White Cotton.

Extra Machined Cop.....	per lb.,
No. 1, " "	"
" 2, " "	"

Colored Cotton.

Extra.....	per lb.,
X.....	"
R.....	"
H.....	"
B.....	"
P.....	"

Wool.

R.....	per lb.,
X.....	"
S.....	"
O.....	"

RAGS.

White (washed).....	per lb.,
Colored (washed).....	"

Prices upon application.

For Hot Boxes.

Price.....per lb.....

Upholsterers' Twine	per lb., \$.....
Seaming Cord	"
Trimmers' Tow	"
Excelsior	"
Burlaps for Car Seats, 40 inch 8 oz	per yard.....
" 48 " 12 "	"
" Clothiers' Canvas, extra heavy, 24 inch	"
Webbing, 1½ inch	per piece, 75 yards each,
" 3 "	" " "
" 3½ "	" " "

Best New Orleans, Picked, XXX..... per lb., \$.....
 " " " " XXXX.....

Extra Black Drawings.....	per lb., \$.....
Super Extra Black.....	".....
R R B.....	".....
1 XX Black.....	".....
1 X.....	".....
Pure.....	".....
No. 1.....	".....
" 1 Gray.....	".....
" 1½.....	".....

Rope..... per ton, \$.....
Picked..... "

Prices upon application.

Crimson, Scarlet or Green.....per gross, \$1 00
Discount.....

Black.....	per gross, \$0	20
Green.....	"	25
Brown.....	"	25
Discount.....		

CUSHIONS.

Patent Ventilated.

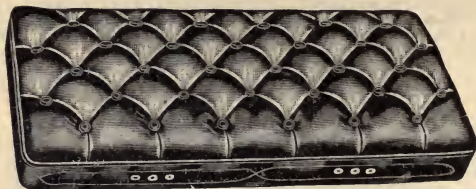


Fig. D. 1199.

The frame of the cushion is composed of wire on which are fastened the coils. Two sizes of coils are used, a high and a low coil. At the top each high coil is connected by a small coil spring. The low coils are trussed and act as one coil, while the high coils act individually.

The cushion has a valve at the back which receives the air, but closes when it is discharged, so that the air is forced out through holes in the top of the cushion, thus keeping the surface of the cushion as well as the body, always cool.

Made in the following styles to any size and height:

- Trimming Leather, tufted with hair.
- Trimming Leather, tufted with moss.
- Trimming Leather, plain.
- Split Leather, plain.
- Pantasote, tufted with hair.
- Pantasote, tufted with moss.
- Pantasote, plain.
- Enameled Duck, plain.

Prices upon application.

Engine and Cab Cushions.

We are also prepared to furnish cushions made in the ordinary way, covered and filled as above.

Prices upon application.

Rattan Seat Covering.

This "Combination Rattan Seating" is made of a close woven cane, re-enforced by canvas, cemented to the under side.

It is made in rolls of about 200 feet, and any width (in even inches) up to 36 inches wide.

Price, per square foot.....	\$0 33
Price, unlined, per square foot.....	30

Discount.....

MOHAIR PLUSH.



We have in stock a fine assortment of all qualities and shades of Mohair Plush used by railroad companies and car builders, and being agents for one of the largest mills we can make lowest manufacturers' prices. We shall be pleased to furnish samples and prices on application.

24 inches wide, carried in stock.

28, 30 and 36 inch, to order.

LEATHER.

Fancy Enameled Trimming Leather, all colors..... per square foot, 30c

Discount.....

ENAMELED DUCK.

		Black	Brown or Green.
36 inches wide.....	per yard	\$0 36	\$0 46
45 " ".....	" "	38	48
50 " ".....	" "	40	50
54 " ".....	" "	44	54
56 " ".....	" "	46	...
60 " ".....	" "	59	...

Discount.....

COTTON DUCK.

List Adopted October 10th, 1912.

Price Per Yard.

Nos.	1—0	1	2	3	4	5	6
26 inch....	\$0 58	\$0 55	\$0 52	\$0 49	\$0 46	\$0 43	\$0 40
28 ".....	62	59	56	53	49	46	43
30 ".....	67	63	60	56	53	49	46
32 ".....	71	68	64	60	56	53	49
34 ".....	76	72	68	64	60	56	52
36 ".....	80	76	72	68	63	59	55
38 ".....	85	80	76	71	67	62	58
40 ".....	89	84	80	75	70	66	61
42 ".....	93	89	84	79	74	69	64
44 ".....	98	93	88	82	77	72	67
46 ".....	1 02	97	92	86	81	75	70
48 ".....	1 08	1 03	97	91	86	80	74
50 ".....	1 14	1 08	1 02	96	90	84	78
52 ".....	1 18	1 12	1 06	1 00	94	87	81
54 ".....	1 23	1 16	1 10	1 04	97	91	84
56 ".....	1 27	1 21	1 14	1 07	1 01	94	87
58 ".....	1 32	1 25	1 18	1 11	1 05	97	90
60 ".....	1 39	1 32	1 24	1 17	1 10	1 02	95
62 ".....	1 44	1 37	1 29	1 22	1 14	1 07	99
64 ".....	1 49	1 41	1 33	1 26	1 18	1 10	1 02
66 ".....	1 54	1 46	1 38	1 29	1 21	1 13	1 05
68 ".....	1 58	1 50	1 42	1 33	1 25	1 17	1 08
70 ".....	1 63	1 54	1 46	1 37	1 29	1 20	1 12
72 ".....	1 71	1 62	1 53	1 44	1 35	1 26	1 17
74 ".....	1 76	1 67	1 58	1 48	1 39	1 30	1 21
76 ".....	1 81	1 71	1 62	1 52	1 43	1 33	1 24
78 ".....	1 86	1 76	1 66	1 56	1 47	1 37	1 27
80 ".....	1 90	1 80	1 70	1 60	1 50	1 40	1 30
82 ".....	1 95	1 85	1 75	1 64	1 54	1 44	1 34
84 ".....	2 00	1 89	1 79	1 68	1 58	1 47	1 37
86 ".....	2 14	2 03	1 92	1 80	1 69	1 58	1 47
88 ".....	2 19	2 08	1 96	1 84	1 73	1 62	1 50
90 ".....	2 24	2 12	2 00	1 89	1 77	1 65	1 53
92 ".....	2 29	2 17	2 05	1 93	1 81	1 69	1 57
94 ".....	2 34	2 22	2 09	1 97	1 85	1 72	1 60
96 ".....	2 39	2 26	2 14	2 01	1 89	1 76	1 64
98 ".....	2 49	2 36	2 23	2 10	1 97	1 84	1 71
100 ".....	2 54	2 41	2 27	2 14	2 01	1 87	1 74
102 ".....	2 59	2 46	2 32	2 18	2 05	1 91	1 78
104 ".....	2 64	2 50	2 37	2 23	2 09	1 95	1 81
106 ".....	2 69	2 55	2 41	2 27	2 13	1 99	1 84
108 ".....	2 74	2 60	2 46	2 31	2 17	2 02	1 88
110 ".....	2 91	2 76	2 61	2 45	2 30	2 15	2 00
112 ".....	2 97	2 81	2 65	2 50	2 34	2 19	2 03
120 ".....	3 18	3 01	2 84	2 68	2 51	2 34	2 18
128 ".....	3 60	3 41	3 22	3 03	2 84	2 65	2 46
132 ".....	3 92	3 72	3 51	3 30	3 10	2 89	2 69
144 ".....	5 45	5 16	4 87	4 59	4 30	4 01	3 73

Discount

COTTON DUCK.

Continued.

List Adopted October 10th, 1912.

Price Per Yard.

Nos.	7	8	9	10	11	12	Nos.
26 inch....	\$0 39	\$0 35	\$0 33	\$0 30	\$0 28	\$0 26	26 in.
28 "....	42	38	35	32	30	28	28 "
30 "....	44	41	38	34	33	29	30 "
32 "....	47	43	40	36	35	30	32 "
34 "....	50	46	43	39	37	32	34 "
36 "....	53	49	45	41	39	34	36 "
38 "....	56	52	48	43	41	36	38 "
40 "....	59	54	50	45	43	38	40 "
42 "....	62	57	53	48	45	40	42 "
44 "....	65	60	55	50	47	42	44 "
46 "....	68	62	58	52	50	44	46 "
48 "....	72	65	61	55	53	46	48 "
50 "....	75	69	64	58	55	48	50 "
52 "....	78	72	67	60	57	50	52 "
54 "....	81	75	70	63	59	52	54 "
56 "....	84	78	72	65	62	54	56 "
58 "....	87	80	75	67	64	56	58 "
60 "....	92	84	78	70	67	59	60 "
62 "....	96	88	81	73	70	61	62 "
64 "....	99	90	84	76	72	63	64 "
66 "....	1 02	93	87	78	74	65	66 "
68 "....	1 05	96	89	80	76	67	68 "
70 "....	1 08	99	92	83	78	69	70 "
72 "....	1 13	1 04	97	87	82	72	72 "
74 "....	1 17	1 07	99	89	85	74	74 "
76 "....	1 20	1 10	1 02	92	87	76	76 "
78 "....	1 23	1 13	1 05	94	89	78	78 "
80 "....	1 26	1 16	1 07	97	91	80	80 "
82 "....	1 29	1 18	1 10	99	94	82	82 "
84 "....	1 32	1 21	1 13	1 01	96	84	84 "
86 "....	1 41	1 29	1 20	1 08	1 02	89	86 "
88 "....	1 44	1 32	1 23	1 11	1 04	91	88 "
90 "....	1 48	1 35	1 26	1 13	1 07	94	90 "
92 "....	1 51	1 38	1 29	1 16	1 09	96	92 "
94 "....	1 54	1 41	1 31	1 18	1 11	98	94 "
96 "....	1 58	1 44	1 34	1 21	1 14	1 00	96 "
98 "....	1 64	1 51	1 40	1 26	1 18	1 04	98 "
100 "....	1 67	1 54	1 43	1 28	1 21	1 06	100 "
102 "....	1 71	1 57	1 45	1 31	1 23	1 08	102 "
104 "....	1 74	1 60	1 48	1 33	1 26	1 10	104 "
106 "....	1 78	1 63	1 51	1 36	1 28	1 12	106 "
108 "....	1 81	1 66	1 54	1 39	1 31	1 14	108 "
110 "....	1 92	1 76	1 63	1 47	1 38	1 21	110 "
112 "....	1 95	1 79	1 66	1 49	1 40	1 23	112 "
120 "....	2 09	1 92	1 78	1 60	1 50	1 32	120 "
128 "....	2 32	2 16	1 97	1 82	.....	.....	128 "
132 "....	2 52	2 35	2 14	1 96	.....	.....	132 "
144 "....	3 49	3 24	2 95	2 69	.....	.....	144 "

Discount.....

CARPET GROMMETS AND KNOBS.

Fig. D. 1200.
Conical.Fig. D. 1201.
Spur.

Patent Conical Pointed, Rolled Rim, of Sheet and Cast Brass.

Numbers.....	2	3	4	5	6	7	8
Diameter of hole as inserted.....	$\frac{1}{8}$ in.	$\frac{1}{16}$ in.	$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$1\frac{1}{8}$ in.
Price, per gross.....	\$2 00	2 70	3 60	4 75	6 25	8 50	10 00

Discount.....

Patent Spur Brass Grommets.

Numbers.....	0	1	2	3	4	5	6	7	8
Diam. of hole as inserted	$\frac{1}{8}$ in.	$\frac{1}{16}$ in.	$\frac{1}{4}$ in.	$\frac{1}{8}$ in.	$\frac{1}{2}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$1\frac{1}{8}$ in.
Price, per gross.....	\$1 60	1 80	2 00	2 70	3 60	4 75	6 25	8 50	10 00

Discount.....

Brass Head Grommet Knobs.

With Strong Wrought Nails.

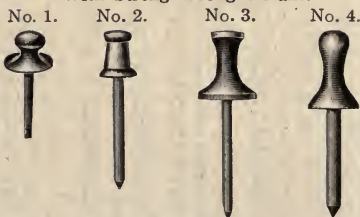


Fig. D. 1202.

No. 1.....	per gross,	\$3 00	No. 3.....	per gross,	\$7 00
" 2.....	"	4 00	" 4.....	"	7 50

Discount.....

For carpets, mattings, etc., railway coaches, steamboats, yachts, halls, and large rooms. Above cuts show one-third size. Rolled-rim spur grommet No. 3 can be used with any of the above sizes, their sharp teeth holding firmly in whatever material the grommet is used.

GROMMET TOOLS.

Fig. D. 1203.
Inserting Die.Fig. D. 1204.
Pat. Cutter
or Punch.Fig. D. 1205.
Side Cutter
or Punch.

Numbers.....	0	1	2	3	4	5	6	7	8
Inserting Die.....	\$2 00	\$2 15	\$2 25	\$2 35	\$2 50	\$2 70	\$2 80	\$3 00	\$3 25
Pat. Cutter or Punch..	1 00	1 00	1 20	1 30	1 50	1 75	2 00	2 25	2 50
Side Cutter or Punch..	50	50	50	65	75	1 00	1 50	1 60	1 75
*Price per set.....	3 00	3 15	3 45	3 65	4 00	4 45	4 80	5 25	5 75

*Set consists of three parts: Inserting Die (2 parts), and Patent Cutter or Punch (1 part).

Discount.....

CONDUCTORS' PUNCHES.

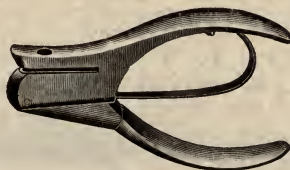


Fig. D. 1206.

Price.....per doz., \$30 00

Discount.....

STEAM WHISTLES.

Bronze.



Fig. D. 1207.

Plain Whistle, with valve.



Fig. D. 1208.

Chime Whistle.

Price, Plain Whistle.

Diameter of Bell, Inches	2	2½	3	3½	4	5	6	8	10
Size steam pipe, inches.	¾	¾	1	1	1½	1½	2	2½	3
Price, each, without valve.....	\$4 35	5 25	7 25	9 50	12 00	19 00	24 00	70 00	150 00
Price, each, with valve.	5 50	6 50	8 50	11 50	15 00	22 50	33 00	95 00	210 00

Price, Chime Whistle.

Diameter of Bell, Inches...	1½	2	2½	3	4	5	6	8	10	12
Size, steam pipe inches.....	¾	¾	¾	¾	1	1½	1½	2	2½	3
No. 1, without valve, each....	\$4 50	5 00	7 50	9 50	15 00	28 00	42 00	95 00	190 00	280 00
No. 2, with up'r't valve, each....	.....	.....	.....	.....	20 00	35 00	50 00	.....	.....	.....
No. 3, with side valve, each....	6 00	8 00	11 00	14 00	20 00	35 00	50 00	110 00	210 00	300 00

Discount.....

Always order whistles by the diameter of bell and not by the size of pipe.

CORD.**Sash.****Fig. D. 1209.**

No.	Diameter, Inches.	Approximate Weight per Dozen Hanks.	Number Feet per Pound.	Suitable for Sash Weights Weighing.
6	$\frac{1}{16}$	18 lbs.	66	Less than 10 lbs.
7	$\frac{3}{32}$	23 "	52	From 10 to 15 lbs.
8	$\frac{1}{8}$	27 "	44	From 15 to 25 "
9	$\frac{5}{32}$	33 "	36	From 25 to 35 "
10	$\frac{3}{16}$	44 "	27	From 35 to 45 "
12	$\frac{1}{4}$	60 "	20	Heavier than 45 lbs.

Put up in hanks of 100 feet each, two connected; one dozen hanks (1,200 feet) in a package. Also furnished in coils any length.

White Cotton.....	per lb.,	\$0 50
Drab Cotton.....	"	55
Italian Hemp.....	"	55
Linen.....	"	67½

*Discount.....***Railroad Bell and Signal.**

White Cotton.....	per lb.,	\$0 50
Drab Cotton.....	"	55
Mahogany Cotton.....	"	57½
Leather Cord.....	per ft.,	04

*Discount.....***"Spot" Trolley.****Fig. D. 1210.**

This is an extra quality cord, the colored spot (trade mark) used only in this quality. It is braided hard, smoothly finished, carefully inspected and thoroughly water-proofed, making it the most durable, and therefore the most economical cord for this purpose. Put up in coils of about 1,200 feet each.

Size No.....	8	9	10	12
Diameter.....	$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.
Approximate weight per coil..	30 lbs.	36 lbs.	48 lbs.	66 lbs.

Prices upon application.

BELL CORD COUPLINGS.**Fig. D. 1211.**

Japanned (Mal. Iron) ..	per doz.,	\$0 60
Brass.....	"	1 25
Nickel Plated (Brass) ..	"	1 50

The couplings are for No. 8 cord unless ordered for No. 9.

*Discount.....***CAR CANDLES.**

C., A. & Co.'s Hydraulic Pressed.....	per lb.,	\$0 15
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Discount.....

BELTING.

Rubber.

Adopted May 1, 1910.

Price, per foot.

Inch.	2-Ply.	3-Ply.	4-Ply.	5-Ply.	6-Ply.	7-Ply.	8-Ply.
1	\$0 09	\$0 11	\$0 13				
1½	11	13	16				
1¾	13	15	19	\$0 23			
1½	15	17	22	27			
2	18	20	25	31	\$0 37		
2½	22	25	31	38	46		
3	26	30	37	45	55		
3½	30	35	43	53	65		
4	34	40	50	61	75	\$0 86	
4½	38	45	55	69	84	96	
5	42	50	61	76	91	1 06	
6	50	60	72	89	1 08	1 25	\$1 44
7	59	70	84	1 04	1 25	1 46	1 68
8	67	80	96	1 19	1 44	1 68	1 92
9	76	90	1 07	1 34	1 60	1 88	2 16
10	84	1 00	1 20	1 49	1 77	2 09	2 40
11	92	1 10	1 32	1 63	1 96	2 29	2 62
12	1 00	1 20	1 43	1 78	2 15	2 50	2 85
13	1 10	1 30	1 56	1 95	2 34	2 73	3 12
14	1 19	1 40	1 69	2 11	2 54	2 96	3 39
15	1 28	1 52	1 83	2 28	2 74	3 19	3 65
16	1 37	1 65	1 96	2 44	2 94	3 42	3 92
18	1 55	1 87	2 22	2 77	3 33	3 88	4 44
20	1 74	2 09	2 49	3 10	3 73	4 35	4 97
22	1 94	2 33	2 77	3 47	4 16	4 85	5 54
24	2 16	2 60	3 08	3 85	4 62	5 39	6 16
26	2 38	2 86	3 39	4 23	5 08	5 93	6 78
28	2 60	3 12	3 70	4 62	5 54	6 47	7 39
30	2 82	3 39	4 00	5 00	6 00	7 00	8 00
32	3 04	3 65	4 31	5 39	6 47	7 55	8 62
34	3 26	3 92	4 62	5 78	6 93	8 09	9 24
36	3 48	4 18	4 93	6 16	7 39	8 62	9 86
38	3 70	4 44	5 24	6 55	7 85	9 16	10 47
40	3 92	4 71	5 55	6 93	8 32	9 70	11 09
42	4 14	4 97	5 85	7 32	8 78	10 24	11 70
44	4 36	5 24	6 16	7 70	9 24	10 78	12 32
46	4 58	5 50	6 47	8 08	9 70	11 32	12 94
48	4 80	5 76	6 73	8 47	10 16	11 86	13 55
50	5 02	6 03	7 08	8 85	10 63	12 40	14 17
52	5 22	6 29	7 39	9 24	11 09	12 94	14 78
54	5 46	6 56	7 70	9 63	11 55	13 48	15 40
56	5 68	6 82	8 01	10 01	12 01	14 01	16 02
58	5 90	7 08	8 32	10 40	12 47	14 55	16 63
60	6 12	7 35	8 62	10 78	12 94	15 09	17 25

Discount.....

All other widths at proportionate prices.

BELTING.

Oak-Tanned Leather.

Width, Inches.	Price, per Foot.	Width, Inches.	Price, per Foot.	Width, Inches.	Price, per Foot.	Width, Inches.	Price, per Foot.
$\frac{1}{2}$	\$0 12	4	\$0 96	17	\$4 08	36	\$8 64
$\frac{3}{4}$	15	4 $\frac{1}{2}$	1 08	18	4 32	38	9 12
1	18	5	1 20	19	4 56	40	9 60
$1\frac{1}{4}$	21	5 $\frac{1}{2}$	1 32	20	4 80	42	10 08
$1\frac{1}{2}$	24	6	1 44	21	5 04	44	10 56
$1\frac{3}{4}$	30	6 $\frac{1}{2}$	1 56	22	5 28	46	11 04
2	36	7	1 68	23	5 52	48	11 52
$2\frac{1}{4}$	42	8	1 92	24	5 76	50	12 00
$2\frac{1}{2}$	48	9	2 16	25	6 00	52	12 48
$2\frac{3}{4}$	54	10	2 40	26	6 24	54	12 96
3	60	11	2 64	27	6 48	56	13 44
$3\frac{1}{4}$	66	12	2 88	28	6 72	60	14 40
$3\frac{1}{2}$	72	13	3 12	29	6 96	64	15 36
$3\frac{3}{4}$	78	14	3 36	30	7 20	68	16 32
4	84	15	3 60	32	7 68	72	17 28
$4\frac{1}{4}$	90	16	3 84	34	8 16		

Double belts, double price. Intermediate widths at proportionate prices.
Special belts, special price.

Discount.....

ROUND BELTS.

(Per foot)

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	1
Twisted.....	\$0 06	\$0 10	\$0 14	\$0 18	\$0 22	\$0 30	\$0 36	\$0 46	\$0 60	\$0 72
Solid.....	05	07	10	14	18	30	36	46	.....	.....

Discount.....

LACE LEATHER.

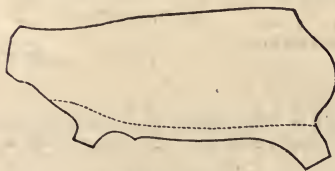


Fig. D. 1212.
"Blu-Skin."

Blu-Skin is entirely different from any lace now on the market. It combines the good qualities of Raw Hide and Tanned Lace, has great strength, is soft and pliable and will remain so even when exposed to steam, moisture, heat or gases. There is very little stretch to it, and once put in the belt, stays there.

Blu-Skin is trimmed from 10 to 15 per cent closer than the average lace leather, as the flank and shanks are trimmed off in the green hide, as

indicated by dotted line. Thus the entire side can be used for lacing.
Price per square foot \$0 40
Tanned lace leather per square foot 35

Discount.....

CUT LACINGS.

Width, Inches.	Price per Bundle	Width, Inches.	Price per Bundle.	Width, Inches.	Price per Bundle
$\frac{1}{2}$	\$1 25	$\frac{3}{4}$	\$2 00	$\frac{1}{2}$	\$3 75
$\frac{3}{4}$	1 50	$\frac{1}{2}$	2 25	$\frac{3}{4}$	4 50
$\frac{1}{2}$	1 75	$\frac{1}{2}$	3 00	1	5 00

Put up in 100-foot bundles.

Discount.....

RUBBER PACKING.

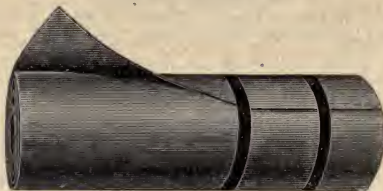


Fig. D. 1213.

Cloth Insertion. Cloth on One or Both Sides.

Price Per Pound

Thickness.	1-Ply.	2-Ply.	3-Ply	4-Ply.
1-64 inch	70c.	...	...	...
1-32 "	65	...	...	...
1-16 "	60	63c.	66c.	...
3-32 "	55	58	61	...
1-8 "	55	55	58	61c
3-16 "	55	55	55	58
1-4 "	55	55	55	55

One ply of cloth to every $\frac{1}{16}$ inch thickness. Three cents per lb. additional will be charged for each extra ply of cloth. Each cloth, whether insertion or outside, is counted as one ply. Made one yard wide, in rolls of any desired length.

Discount.....

Red Sheet Packing.

Per lb.,\$0 80

Discount.....

Pure Sheet Packing or Valve Gum.

About 1 yard wide, and any thickness or length desired.....per lb., \$1 40

Discount.....

Gaskets or Rings.



Fig. D. 1214.

Cloth Insertion.

1-16 inch thick or less.....per lb., \$1 25
 3-32 inch thick or upwards.....per lb., 1 00

Discount.....

RUBBER MATTING.



Fig. D. 1215.

Corrugated.



Fig. D. 1216.

Pebble.

Furnished in any thickness from $\frac{3}{8}$ inch to $\frac{1}{2}$ inch; in widths up to 50 inches and any length required. This is a special, strong matting with a burlap back.

Stair treads cut to order.

Prices on application.

ASBESTOS.

Piston Rod Packing.

On reels of about 25 and 50 lbs.....	per lb.,
“ “ from 10 to 15 lbs.....	“

Wick Packing.

In cases of 25 and 50 lbs.....	per lb.,
--------------------------------	----------------

Mill-Board or Flat Packing

In sheets 40 inches square, in cases of about 225 lbs.....	per lb.,
--	----------------

Gaskets, Rings and Washers.

Regular shapes.....	per lb.
Rings and Washers, 3 ins. diameter or less.....	“

Prices upon application.

PACKING.

Spiral Piston Rod.

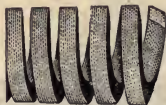


Fig. D. 1217.
Spiral.



Fig. D. 1218.
Rings.

Spiral Packing is made in twelve-foot lengths, and furnished in sizes up to two inches. Each box contains one coil. We carry all the regular sizes in stock. Per lb.....\$1 20

Rings are made either single or double, are cut from the same stock, and treated in the same manner as the Spiral Packing.

We cut to exact sizes as specified. Double rings can be cut only in the larger sizes. Per lb.....\$1 20

Discount.....

SQUARE AND ROUND.

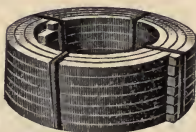


Fig. D. 1219.



Fig. D. 1220.

Square Duck Packing.

Used for ordinary pump work. Made in 18-foot lengths.

Rubber Back Packing.

Made in lengths of 18 feet.

Hydraulic Square Duck Packing.

Made of alternate layers of high quality, fine, close-woven duck and best rubber.

Round Piston Rod Packing.

Made in lengths of 12 feet, from $\frac{1}{4}$ to $\frac{7}{8}$ inch in diameter with pure rubber core.

Pure Gum Packing.

Either round or square. Made of different qualities of rubber to meet the different demands.

Hemp Packing.

American Hemp Packing, A1 Superior	per lb.,
Water Pipe " " Jute	"
Italian Hemp Packing, A	"
" " B	"

Prices upon application.

"PALMETTO" PACKING.**Self Lubricating.**

Fig. D. 1221.

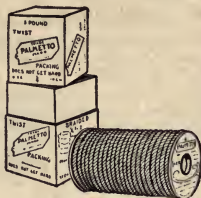
**Braided.
Round and Square.**

Fig. D. 1222.

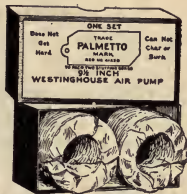
**Twist.
For Small Valves.**

Fig. D. 1223.

**Sets.
For Air Pumps.**

Style.	Sizes.	Packages.	Price.
Braided, Rd. and Sq.	$\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, $\frac{15}{16}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$ and 2 inches.	5-lb. boxes.	\$1 00 per lb.
Twist.....	$\frac{1}{4}$ -inch $\frac{1}{8}$ -inch $\frac{1}{2}$ -inch	1-lb. spools	1 00 per lb.
To 1 lb.....	120 75 50 feet.		
Sets.....	8-inch and 9 $\frac{1}{2}$ -inch Westinghouse Air Pumps.....	Set for one pump....	44 per set
Sets.....	11-inch Westinghouse Air Pumps....	Set for one pump....	88 per set
Sets.....	8 $\frac{1}{2}$ -inch Cross Compound Westinghouse Air Pumps.....	Set for one pump....	1 76 per set
Sets.....	Nos. 1 and 2 N. Y. Duplex Pumps....	Set for one pump....	88 per set
Sets.....	No. 5 New York Duplex Pumps.....	Set for one pump....	2 20 per set
Sets.....	No. 6 N. Y. Duplex Pumps.....	Set for one pump....	88 per set
Sets.....	For Locomotive Throttle Valves.....	Set for one stuffing box	2 00 per lb.

Owing to the heat resisting materials of which "Palmetto" is made, together with the perfect lubrication of each single strand before braiding or twisting, the claim is made that for efficiency and long life there is no rod packing on the market equal to it. "Palmetto" Twist can be unstranded and any size valve packed from one spool, and is far more economical and satisfactory than asbestos wick or braid.

*Discount.....***"MANHATTAN" PACKING.****Self Lubricating.**

For moderate steam pressure in Marine and Stationary Engines, and the water ends of pumps.

$\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, $\frac{15}{16}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{2}$, and 2 inches.

Price.

Price, $\frac{1}{4}$ -inch and larger, per lb. \$1 00

Discount.....

Fig. D. 1224.

MILBURN ACETYLENE LIGHTS.

No. 3-X.

5,000 to 12,000 Candle Power.

According to U. S. Government reports, the candle power of this light at the axis exceeds 15,000 C. P., and 5,000 to 12,000 C. P. is the average over a wide area.

This light is recognized by all users to be the most perfect and efficient light made. It burns over half air, is smokeless, incandescent, absolutely storm-proof and unaffected by vibration, wind or weather.

It lights instantly and requires no attention during use, and the flame can be regulated from a needle point to the maximum candle power of the light.

It is supplied with an *extra cylinder enabling it to be recharged immediately and giving a total burning capacity of 17 hours.

Supplied for trial and comparison with any other light.

Size, Inches.	Height.	Weight, Packed.	Charge Carbide, Each Cylinder.	Price Complete.
12x12x36	6 feet	121 lbs.	16 lbs.	*\$83 00

*This light if supplied with only one cylinder, \$71.00.
Extra cylinders without this outfit are \$18.00 each.



Fig. D. 1225.

No. 2.

3,000 Candle Power.

The No. 2 light is very similar in construction to our Standard No. 3-X, and being of much lighter capacity is extremely serviceable to builders, contractors, mines, railroads, etc., when less light is required than supplied by the No. 3-X. It has a 12-inch non-tarnishable aluminum reflector and absolutely storm-proof burner, and the flame can be regulated from a needle point to 3,000 candle power.

It is supplied with an extra cylinder which enables the light to be recharged immediately and giving a total burning capacity of 12 hours.

Absolutely guaranteed by the manufacturers and ourselves.



Fig. D. 1226.

Size, Inches.	Height.	Weight, Packed.	Each Cylinder, Charge.	Price Complete, with Extra Cylinder.
10x10x30	5 feet	75 lbs.	9 lbs.	\$62 00

This light if supplied with only one cylinder, \$50.00.

Extra cylinders without this outfit are \$18.00 each.

Carbide, in 100 lb. drums\$3 75

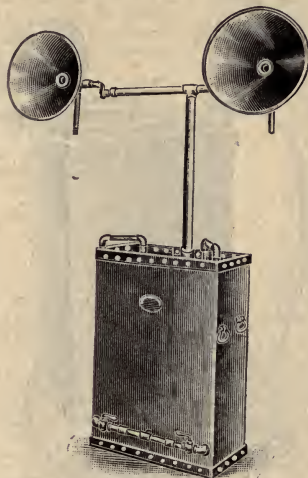
MILBURN ACETYLENE LIGHTS.**12,000 Candle Power Lights 3,000 Feet.**

Fig. D. 1227.
No. 4-Z.

This is the same as the famous No. 3-X, except that it has twin cylinders, two storm-proof burners and two all-aluminum non-tarnishable reflectors. It is constructed to withstand hard usage and gives a very powerful light.

Milburn lights are made in styles and sizes from 50 to 24,000 candle power to meet all requirements. If you do not see what you want, write for special catalogue and full information.

Over 70,000 lights in use.

Size, Inches.	Height, Feet.	Weight, Packed.	Charge Carbide.	Burning Capacity.	Price, Complete.
12x24x36	6	223 lbs.	32 lbs.	Up to 12 hours	\$114 00

Carbide, in 100 lb. drums. \$3 75

MILBURN ACETYLENE LIGHTS.

5,000 to 12,000 Candle Power.

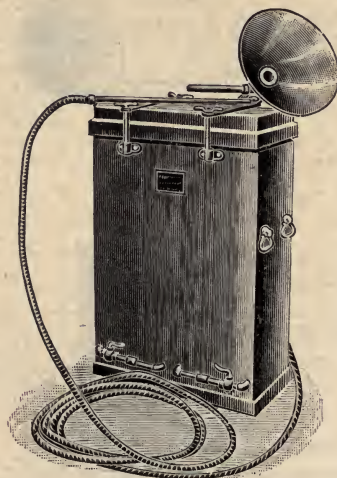


Fig. D. 1228.

No. 4-W.

This light is designed for the lighting of steam shovels, dredges, etc. Its dimensions are 12x24x36 inches and is supplied with two reflectors and storm-proof burners, giving 12,000 candle power each, with water tight cover and 25 feet of hose. It is especially serviceable where several small burners in addition to the reflector are needed, or where a single light is required to burn more than 12 hours. It cannot be affected by vibration and is inextinguishable by the hardest wind.

Weight, Empty, Lbs.	Weight, Packed, Lbs.	Charge Carbide, Lbs.	Burning Capacity.	Price Complete.
200	250	32	Up to 12 hours	\$140 00

Carbide, in 100 lb. drums..... \$3 75

MILBURN ACETYLENE LIGHTS.

5,000 to 12,000 Candle Power.

The No. 3-W is for uses similar to the No. 4-W, only is not recommended for use where small burners in addition to the reflector are required. It is the equivalent of the standard No. 3-X and is constructed to stand the hardest usage, such as the vibration of steam shovels, cranes, dredges, wreckers, etc. Has 15-inch, all-aluminum, non-tarnishable reflector, absolutely storm-proof burner, and 25 feet of hose.

If an extra cylinder is to be used, the light can be recharged immediately, giving it a total burning capacity of 17 hours.

Size, Inches.	Weight, Empty, Lbs.	Weight Packed, Lbs.	Charge Carbide, Lbs.	Burning Capacity, Hours.	Price, Complete.	Extra Cylinder Complete.
12x12x36	100	140	16	9	\$98 00	\$18 00

Carbide, in 100 lb. drums.....\$3.75

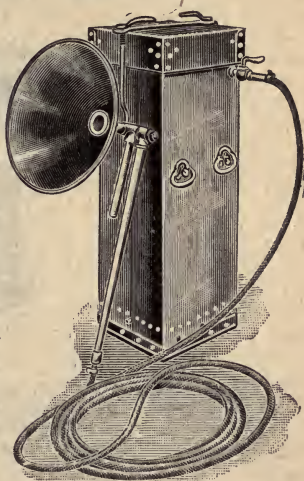


Fig. D. 1229. No. 3-W.

500 Candle Power.

Burns 10 Hours.

This light, being so constructed that it can be carried about in the hand or reflected in any direction, is extremely serviceable for railroads, mines, contractors, builders, etc. It has 10-inch, all-aluminum, non-tarnishable reflector on swing joint which enables it to be swiveled in any direction desired.

Price, Complete.	Size, Inches.	Charge Carbide.	Weight, Packed.
\$20 00	7x14	2½ lbs.	28 lbs.

Note.

A special light is made for fire departments, salvage corps, street railways and emergencies, the same size, description and price as the "Builder," but giving 4,000 candle power for 90 minutes only. This is invaluable where a very powerful light is required for a short time; is positively the most powerful portable light of its size.

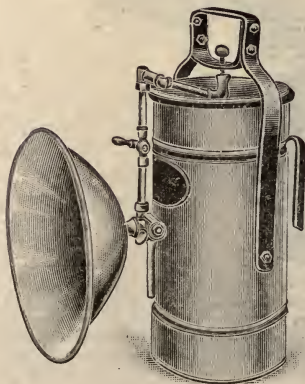


Fig. D. 1230

BLOW TORCHES.

Gasoline.

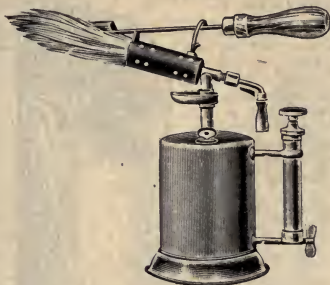


Fig. D. 1231.
No. 12.

No. 12.—Capacity 1 quart; consumption $\frac{1}{4}$ pt. per hour. Price, each, \$4 50

No. 312.—Same as above; capacity 1 pint. Price, each, 3 25

Hooks for soldering irons packed loose with above torches.

Discount.....

Gasoline.

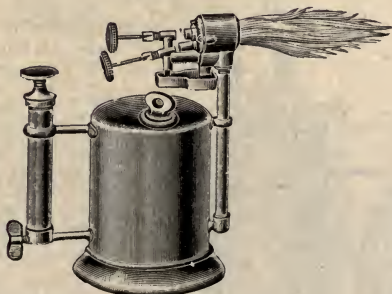
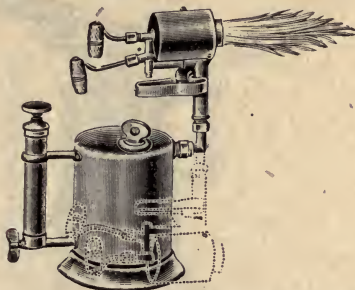


Fig. D. 1232.
No. 92.—Double Jet Torch.

About 3,000 degrees F. of heat can be obtained with this torch which nearly double the capacity of torch with single valve burners.

Capacity 1 quart; consumption $\frac{1}{2}$ pt. per hour. Price each..... \$6 75

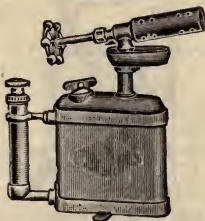
Discount.....

BLOW TORCHES.**"Turner."****Gasoline.****Fig. D. 1233.****No. 96.**

No. 96.—Double jet torch, with wind guard. Burner has swing joint. About 3,000 degrees F. of heat can be obtained from this torch which is nearly double the capacity of torch with single jet burners.

Capacity, 1 quart; consumption $1\frac{1}{4}$ pts. per hour. Price each.....\$8 50

Discount.....

Gasoline.**Fig. D. 1234.****No. 325.**

This torch is especially designed for mechanics where a good tool is required and of the smallest dimensions. Less than two inches in diameter; equipped with metal spring attached to bottom to prevent tipping over. Improved automatic pump forms the handle. Hook for soldering iron packed loose with this torch.

No. 325.—Capacity 1 pint; consumption $\frac{1}{4}$ pt. per hour. Price, each, \$4 50

Discount.....

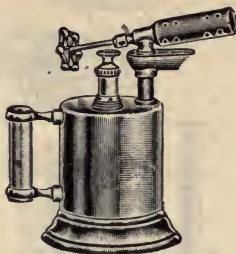
BLOW TORCHES.**"Turner."****Gasoline.**

Fig. D. 1235.

No. 210.

This torch is equipped with latest improved burner, with automatic brass pump in tank. It will generate a brazing heat of 2,500 Fahrenheit. The tank is made of 18 gauge seamless brass, highly polished, and equipped with concave brass bottom fitted with non-leaking filler plug.

No. 210.—Capacity 1 quart; consumption $\frac{1}{2}$ pint per hour. Price, each, \$4 50

Discount.....

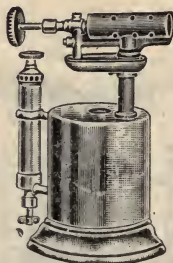
Kerosene.

Fig. D. 1236.

No. 226.

This kerosene torch generates and burns kerosene as satisfactorily as gasoline is burned in the ordinary gasoline blow torch, and produces a high quality of flame under perfect control and free from odor.

We recommend this torch especially for inside use and for work in localities where insurance underwriters forbid the use of gasoline. This torch, however, can be used for burning gasoline as well as kerosene or a mixture of both.

No. 226.—Capacity 1 quart; consumption $\frac{1}{2}$ pint per hour. Price, each, \$5 50

Discount.....

Hooks for soldering irons packed loose with both of the above style torches.

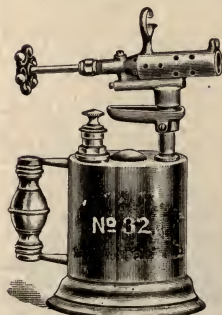
BLOW TORCHES.**"Clayton & Lambert."****Gasoline.**Fig. D. 1237.
No. 17.

These torches have the pump-in-the-handle feature, demanded by many. The pump end embraces in construction the spring check valve. An air tube leads from the bottom of the pump to top of tank, avoiding gasoline escaping through the pump should the check valve refuse to work. Burner produces an ideal blue flame.

No.	Capacity.	Price Each.
*16	One Quart.....	\$5 25
17	One Quart.....	5 50
*18	One Pint.....	4 75
19	One Pint.....	5 00

*Furnished without hook or support for holding soldering coppers.

Discount.....

Fig. D. 1238.
No. 32.**Gasoline.**

A perfect fire indoors or out, in hard wind or extreme cold. A strong blast heat is generated by a powerful burner. A small amount of gasoline is required. This torch is strong, exceedingly well built and handsomely finished.

No.	Capacity.	Price Each.
*31	One Quart.....	\$4 25
32	One Quart.....	4 50
*37	One Pint.....	3 75
38	One Pint.....	4 00

*Furnished without hook or support for soldering coppers.

Discount.....

BLAST FURNACE.

“Turner.”
Gasoline.

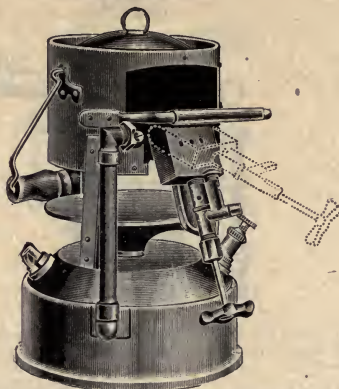


Fig. D. 1239. Nos. 38 and 39.

The burner is mounted on a swing joint, enabling the operator to use the flame in any position desired. Will heat a kettle of lead and a pair of coppers at same time. The hood can be taken off by means of a plug and tank with burner used separately. Automatic brass pump set inside of tank. No gasoline can enter the pump.

No. 38.—Capacity 4 quarts; consumption $\frac{1}{2}$ pt. per hour.

Price, each, \$9 00

No. 39.—Capacity 3 quarts; consumption $\frac{1}{2}$ pt. per hour.

Price, each, 7 75

Discount.....

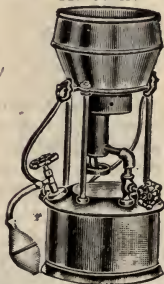
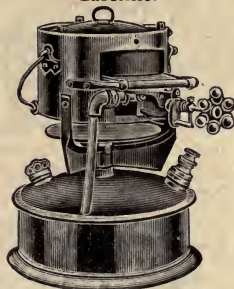
Kerosene.

Fig. D. 1240. No. 142.

A coil furnace built on improved principles. It will burn either kerosene or gasoline, or a mixture of both, without any change in the adjustment. It is a marvel for producing heat, and plenty of it. It will produce a flame at least one-third hotter than the regular coil furnace.

No. 142.—Capacity 1 gallon; consumption 1 pint per hour. Price, each, \$3 50

Discount.....

BLAST FURNACES.**"Clayton & Lambert."
Gasoline.****Fig. D. 1241. No. 1.**

Is 12½ inches high, 9½ inches in diameter at base, 6½ inches in diameter at top.

The tank is made of heavy galvanized iron (thoroughly brazed) because this metal enables the tank to withstand hard usage.

The burner quickly produces an ideal blue flame, easily regulated, giving satisfactory results in windy or cold weather, and is attached to a swivel joint, which permits moving the flame up or down.

No.	Capacity.	Price, Each.
1	Seven Pints	\$8 00
5	Five Pints	6 50

*Discount.....***Gasoline.****Fig. D. 1242. No. 20.**

Is fitted with automatic brass air pump which is more durable than bulbs. Produces a blue blast flame that is intensely hot. The heavy galvanized tank, which has galvanized bottom, and is very strong.

No.	Capacity.	Price, Each.
20	One Gallon	\$5 00
*10	One Gallon	4 75

*Exactly like No. 20, except is fitted with rubber bulb instead of pump.

Discount.....



Fig. D. 1243.
No. 88.

For Kerosene or Gasoline.

The No. 48 Giant is one of the most powerful braziers on the market, has the adjustable burner and brazing stand. Can also be raised or lowered.

Construction of tank, same as the No. 88, except that pump is permanently attached to tank.

Size of flame at burner, 2 inches; length of flame, 12 inches; capacity, 10 gallons; height over all, 40 inches; diameter 14 inches; net weight, 100 pounds; consumption, 3 pints per hour.

No. 48, for gasoline.....	\$22 50
No. 48, for kerosene.....	27 50

When ordering state if for gasoline or kerosene.

Discount.....

BRAZING FORGES.

"Turner."

For Gasoline.

The burners on this forge are mounted on swivel connections at points marked "S" (see cut) so that flames may be turned in any direction. Fire brick are furnished which retain the heat around part to be brazed and the table supporting these bricks may be raised or lowered, *independent of the burners*.

The tank is of pressed seamless steel, galvanized and tested at 150 pounds air pressure.

Size of flame at burner, $1\frac{1}{4}$ inches, length of flame 10 inches, capacity 10 gallons, height over all $49\frac{1}{2}$ inches diameter 12 inches, net weight 100 pounds.

Consumption 3 pints per hour.

No. 88, price	\$25 00
No. 153 Foot Pump, <i>Extra</i>	2 75

Discount.....



Fig. D. 1244.
No. 48.

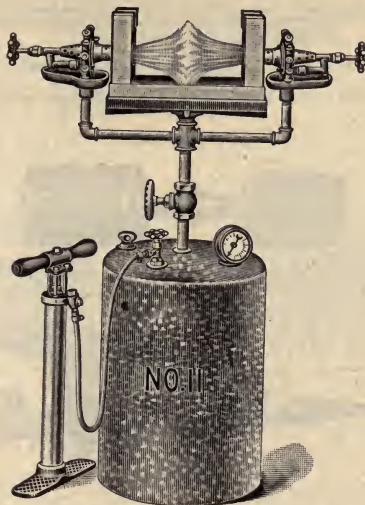
BRAZING FORGES.**"Clayton & Lambert."**

Fig. D. 1245.

No. 11.

For Gasoline.

The tank, which has a capacity of ten gallons, is constructed of heavy steel with brazed seams and galvanized. The large compound brass air pump is separate from the tank and enables the operator to secure the required pressure quickly. Use lubricating oil often on pump washers. A recessed filler plug with washer, tightly fits a grooved collar, making an air tight joint. Equipped with pressure gauge. Strong, powerful round burners, provided with needle points and easily regulated, produce intensely hot blue flames, using very little gasoline. The brazier is fitted with a fire clay muffle, protecting the fire from draft and enabling a competent user to successfully do light brazing. This is a favorite fire for the lighter kinds of brazing, tempering, annealing, etc. Shipping weight, 75 lbs. Operated under working pressure of 60 lbs.

Price complete	\$18 00
Price of No. 11 brazing head, complete with valve	8 00
Price of tank, complete with pump, gauge and filler plug	13 40
Burners only each	2 50

Discount

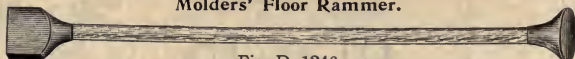
FOUNDRY SUPPLIES.**Molders' Floor Rammer.**

Fig. D. 1246.

Floor rammer complete, hickory handle, iron butt and pean; length over all, 4 ft..... per doz., \$.....
 Floor rammer complete, iron handle, iron butt and pean; length over all, 4½ ft..... " "

Hand Rammers.

Fig. D. 1247.

Well seasoned hardwood, oil finished, butt 3½-inch diameter.....per pair \$.....
 Prices upon application.

Molders' Bellows.

Fig. D. 1248.

10-inch..... per doz., \$15 00
 12 " " " 18 00
 14 " " " 24 00
 16 " " " 30 00

Discount.....

Riddles.

Extra heavy for foundry use.
 Oak rims. Galvanized steel wire.

Diameter, Inches.	Stock Numbers.	List. Per doz.
16		\$10 00
18	2, 3, 4, 5, 6, 8, 10	12 00
20	.....	15 00

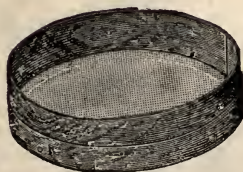


Fig. D. 1249.

Oak Rims. Heavy Brass Wire.

Diameter, Inches.	Stock Numbers.	List. Per doz.
16	2, 3, 4, 5, 6, 8, 10, 12	\$16 00
18	2, 3, 4, 5, 6, 8, 10, 12	18 00
20	.....	20 00

Discount.....

CASTING BRUSHES.

Steel Wire.

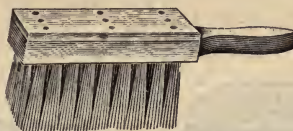


Fig. D. 1250. With Handle.

3 inch, 4 rows..... per doz., \$5 00
Discount.....

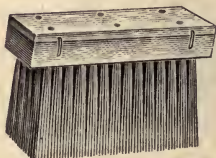


Fig. D. 1251. Plain.

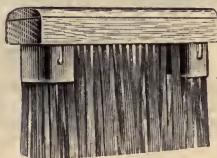


Fig. D. 1252. Bridled.

Plain.

3 inch, 4 row..... per doz., \$3 50
 2½ " 5 " " " 3 75
 4 " 5 " " " 4 00

Bridled.

4 inch, 4 row..... per doz., \$3 75
 4 " 5 " " " 4 50
Discount.....

LEATHER FILLET.

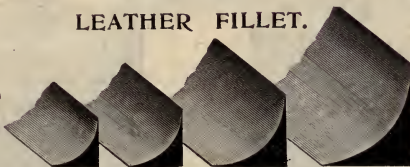


Fig. D. 1253.

Place fillet face down. Apply ordinary glue for wood patterns, shellac for metallic patterns or old work. Press to position with a round stick, the diameter of which is double the "size" or "radius" of fillet applied (i. e., in applying a "½-inch" fillet, use a round stick ½-inch in diameter, etc.), and remove surplus glue with a damp cloth. In applying the larger sizes, dip for an instant in water (hot preferred), before applying the glue.

Shellac face or curved side of fillet a few moments before applying.

No.....	1	2	3	4	5	6	8	10	12	14	16
Size or "Radius" (in inches) ..	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Width of flat face.....	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
Price per 100 feet.....	\$2 00	2 00	3 00	4 00	5 00	6 00	8 00	10 00	12 00	14 00	16 00

Discount.....

MOLDERS' BRUSHES.



Fig. D. 1254.

No. 250. Soft Brush.



Fig. D. 1255.

No. 204B. Hard Brush.

No. 250.	Block 9x1½ in., 4 rows, brass wire drawn, pure black hair, 2½ in. trim.....	Per doz.	\$7 00
No. 204B.	Block 8½x2½ in., solid block, American bristle	" "	6 25

Discount.....

ROOF PAINT BRUSHES.

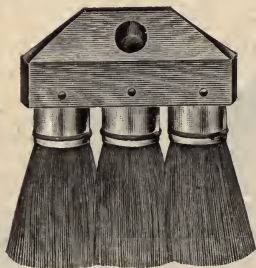


Fig. D. 1256.

No. 629.

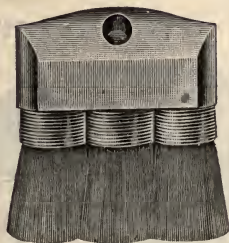


Fig. D. 1257.

No. 627 and 628.

No. 629.	3 knot nickel ferrule mixed bristle.....	Per doz.	\$30 50
No. 628.	3 knot cord wound, oral ferrule, mixed-bristle.....	" "	20 00
No. 627.	3 knot cord wound, oral ferrule, pure bristle	" "	50 00

Discount.....



Fig. D. 1258.

CAR WASHERS.**McLaughlin's Pattern.**

No. 1.....	per doz.,	\$30 00
" 2.....	"	24 00
" 3.....	"	18 00
" 4.....	"	12 00

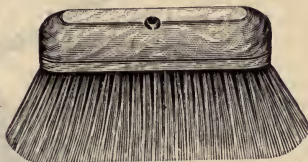
Discount.....

Fig. D. 1259.

"C. A. & Co."

No. 5.	Mixed Russia bristles.....	per doz.	\$24 00
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*Discount.....***SCRUB BRUSHES.**

Fig. D. 1260.

No. 6.	Rice root, 11½ inches.....	per doz.,	\$5 00
" 7.	White Tampico, 10½ inches.....	"	2 50

*Discount.....***COUNTER BRUSHES.**

Fig. D. 1261.

Varnished Handles.

No. 2	8-inch pure bristles, gray body, white casing.....	per doz.,	\$4 75
" 3	9-inch gray American bristles.....	"	5 25
" 4	10-inch " " ".....	"	5 75
" 5	10-inch pure bristles, gray body, white casing.....	"	6 25

Discount.....

ELECTRIC ROTARY MACHINE.

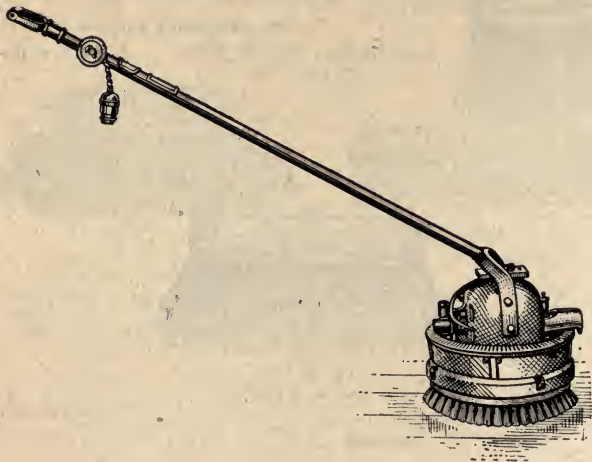


Fig. D. 1262.

For surfacing new or old floors.

For refinishing all kinds of old floors.

For surfacing and polishing—marble, tile, mosaic, terrazzo, cement, rubber, cork, all kinds of composition floors, etc., etc.

For scrubbing, waxing, polishing.

No physical energy is required as the machine works automatically, need not be shoved nor pushed while in operation, also works clean to the wall, well up into corners, in and about small spaces.

Its simple construction makes it practically fool-proof.

The interchangeable attachments are adjusted in less than one minute.

Cost of electrical power varies from three-fourths of a cent to two cents per hour, depending on kind of work being done with machine. Connection can be made on ordinary lighting fixtures or at switch box.

Weight of large type machine is about 70 pounds, and the weight of the various attachments varies from 5 to 25 pounds. All this weight is centered on the rotating disk which is 12 inches in diameter.

One machine will do the work of 9 to 12 men.

The surface produced is positively free from scratches, fluff or other imperfections when used for marble, etc., surfacing, or on wood floors.

Handle bars to fit in handle are furnished which are used when doing the heavier class of work.

When inquiring, mention particular kinds of work interested in and kind of current, whether direct or alternating, and voltage. Descriptive catalogue furnished on request.

Prices upon application.

BRUSHES.**Flue.**

Fig. D. 1263.
Flat Wire.

Single spiral, 1 to 6 inch per inch \$0 30

Discount.....

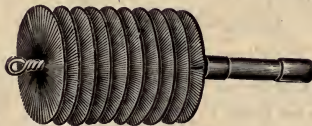


Fig. D. 1264.
Round Wire.

Single spiral, 1 to 6 inch per inch \$0 30
 Double spiral, full brush, 1 to 6 inch per inch 75

Discount.....

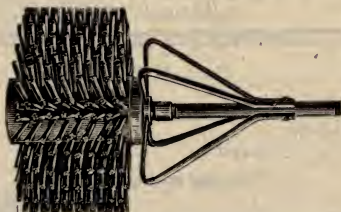


Fig. D. 1265.
Large Cylindrical Wire.

Plain wood hub, 6 inch diameter and larger per inch \$0 75
 Iron hub, 6 inch diameter and larger per inch 1 25

Discount.....

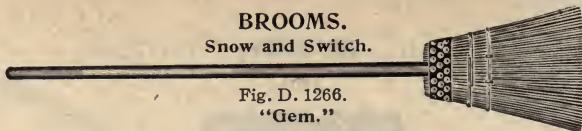
BROOMS.**Snow and Switch.**

Fig. D. 1266.

"Gem."

Our snow brooms are made from double length fibre with good hardwood handles and steel bands. They are strongly put together with wrought nails. Impossible for handles or fibre to work loose. For use on steam and electric railways.

No.	Description.	Style Handle.	Weight per Doz.	Price per Doz.
226-B	All Japanese Cane.....	Plain....	30 lbs.	\$6 50
226-BC	All Japanese Cane.....	Chisel....	37 "	7 50

*Discount.....***"Star."**

No.	Description.	Style Handle.	Weight per Doz.	Price per Doz.
220	Split Bamboo.....	Plain....	33 lbs.	\$5 00

*Discount.....***"Rex"**

No.	Description.	Style Handle.	Weight per Doz.	Price per Doz.
6490	All Japanese Fibre.....	Plain..	30 lbs.	\$4 00

"Boss."

No.	Description.	Style Handle.	Weight per Doz.	Price per Doz.
206	Extra quality fine round rattan	Plain....	24 lbs.	\$12 00

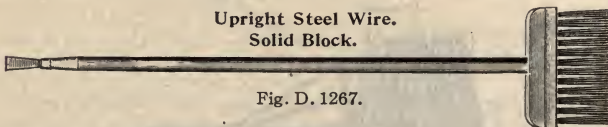
*Discount.....***Upright Steel Wire.****Solid Block.**

Fig. D. 1267.

Price per doz., plain handle \$ 9 50
 Price per doz., chisel handle 10 50

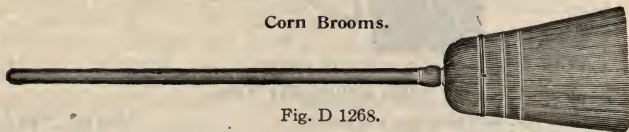
*Discount.....***Corn Brooms.**

Fig. D 1268.

Price per doz., extra heavy \$6 00
 Price per doz., standard 5 00

Discount.....

BROOMS.

Mixed Corn and Fibre.
"Acme."



Fig. D. 1269.

Made with heavy steel bands or heads, in which the stock is securely fastened with clinch nails. It is impossible for handle to work loose or stock to fall out. An excellent general purpose broom.

No.	Description.	Style Handle.	Weight, Per Doz.	Price, Per Doz.
1	Corn and Fibre.	Plain.	28 lbs.	\$5 00
2	" " "	"	30 "	5 50
3	" " "	"	33 "	6 00
4	" " "	"	36 "	6 50

Discount.....

Short Handle Locomotive Broom.



Fig. D. 1270.

No. 236, Japanese fibre, 30-inch plain handle, 32 lbs. per doz., price, per doz., \$7 50

Discount.....

CUSHION BEATERS.



Fig. D. 1271.

Rattan.....per doz. \$.....
Wirewound....." " \$.....

FEATHER DUSTERS.



Fig. D. 1276.

Turkey.

No.....	10	11	12	13	14	15	16	17
Price.....per doz.	\$4 50	5 00	6 00	7 00	8 00	8 50	9 50	11 00

All Tail Feathers.

No.....	12	13	14	15	16	17
Price.....per doz.	\$8 00	9 00	10 00	11 00	13 00	15 00

Discount.....

Ostrich Car Dusters, Extra Heavy.

No.....	1	2	3	4	5
Price.....per doz.	\$50 00	62 00	70 00	75 00	82 00

Discount.....

COTTON MOPS.



Fig. D. 1277.

5, 7, 9, 12 lbs. per doz.....per lb.....

MOP STICKS.



Fig. D. 1278.

With Patent Fastenings.....per doz., \$1 50

SPONGES.

Best Selected, Large, "Sheeps' Wool".....per lb., \$2 25
 Common, " 1 25

CHAMOIS SKINS.

No. 10, Large.....per kip, \$10 00
 " 10 doz. 4 00

Discount.....



Fig. D. 1279.
One Burner.

TORCHES. Heavy Brazed Steel.

Guaranteed not to leak. Seams hard spelter brazed, extra heavy handle, securely riveted. For factories, foundries, rolling mills, blast furnaces, construction work, etc., is a strong durable torch.

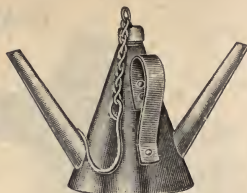


Fig. D. 1280.
Two Burner.

Number.....	80H	81H	82H	83H	84H	85H	86H	87H
Capacity, quarts.....	$\frac{1}{2}$	$\frac{1}{2}$	1	1	2	2	4	4
Number of burners.....	1	1	1	2	1	2	2	3 or 4
Price per doz.....	\$7 00	9 00	10 00	11 00	12 00	13 00	15 00	18 00

Discount.....



Fig. D. 1281.

Inspectors—No. 26.

INSPECTORS' AND LOCOMOTIVE TORCHES—STEEL.

These torches are made of extra heavy steel, making them the strongest and safest torches for railroad use with any kind of oil.



Fig. D. 1282.
Locomotive—Nos. 27 and 28.

Number.....	26	27	28
Capacity, pints.....	1	$1\frac{1}{2}$	$2\frac{1}{2}$
Diameter, inches.....	2	$4\frac{1}{2}$	$5\frac{1}{2}$
Height, inches.....	15	$4\frac{1}{2}$	$4\frac{1}{2}$
Price per doz.....	\$12 00	\$12 00	\$15 00

The above torches furnished polished steel or copper plated.

Discount.....

RAILROAD HAND TORCHES.

For locomotive or stationary engineers' use. The attention of superintendents of motive power and master mechanics is called to the superiority of this torch. Hard spelter brazed seams. Extra heavy handle, securely riveted. Can also furnish this torch with malleable handle instead of strap handle at a slight additional charge.

Number.....	110H	120H
Capacity, pints.....	1	2
Price per doz.....	\$9 00	\$10 00

Discount.....



Fig. D. 1283.
Brazed Steel.

TORCHES.

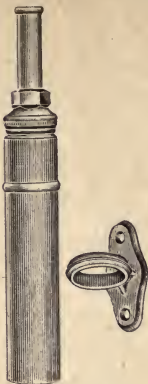


Fig. D. 1284.
Malleable.

Per doz.....\$8 00



Fig. D. 1285.
Tin.

Brass, each.....\$5 00

Tin, per doz..... 6 00

Discount.....

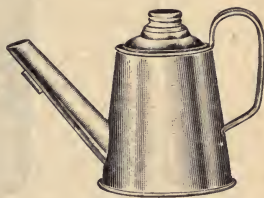


Fig. D. 1286.
Tin.

Per doz.....\$6 00

HAND LAMPS.

Copperized.

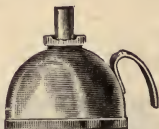


Fig. D. 1287. Nos. 20 to 21.



Fig. D. 1288. Nos. 22 to 24.

No.	Diameter, Inches.	Capacity.	Price Per Dozen.
20	3 $\frac{3}{4}$	5 ounces	\$ 6 00
20 $\frac{1}{2}$	3 $\frac{1}{2}$	$\frac{1}{2}$ pint	9 00
21	4 $\frac{1}{4}$	1 pint	12 00
22	3 $\frac{1}{4}$	1 pint	9 00
23	4	1 $\frac{1}{2}$ pints	12 00
24	4 $\frac{1}{8}$	1 quart 4 ounces	15 00

Discount.....

Malleable Iron.

With Oil Tubes, Kerosene Screw.

Price.....per doz. \$5 00

Discount.....



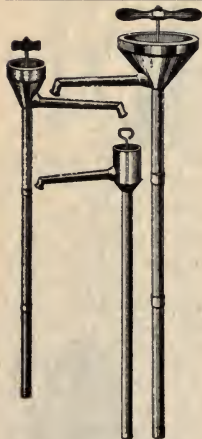
Fig. D. 1289.

OIL TANKS.



Fig. D. 1290.

Gallons.	Diameter, Inches.	Height, Inches.	Weight, Pounds.	Price, Each.
30	22	27	35	\$ 8 00
60	25	31	55	10 00
110	30	37	65	16 00
165	37	37	85	22 00



Discount.....

BARREL PUMPS.

With Brass Valves.

The pumps are made of heavy 1x tin. The Nos. 10 and 15 are re-enforced at the joints. All have brass valves.

No.	Diameter, Inches.	Length, Inches.	Price, Each.	Price, Extra Length, Per Foot.
5	1½	32	\$2 25	\$0 40
5	*1½	54	3 00	50
10	1½	54	4 00	50
15	1½	78	6 50	50

*Special.

No. 10. No. 5. No. 15.
Fig. D. 1291.

Discount.....

TORCHES.

Banjo Gasoline Torches.



Fig. D. 1292.

Single burner, price.....per doz. \$20 00
 Double burner, price.....per doz. 30 00

Discount.....

GASOLINE TANKS.



Fig. D. 1293.

These tanks are made of No. 26 gauge galvanized iron up to 165 gallons; above of heavier material with a 4-inch screw filler cap, and a ground key brass faucet. Nicely decorated. We make above tanks up to 1,000 gallons.

Gallons.	Diameter, Inches.	Height, Inches.	Weight, Lbs.	Price, Each.
30	20	24	35	\$ 8 00
60	26	28	55	10 00
110	30	36	65	14 00
165	37	36	85	20 00

Discount.....

OILERS.

Long Spout.

Fig. D. 1294.
Copperized Steel.Fig. D. 1295.
Tin.
Copperized Steel.Fig. D. 1296.
Tin with Valve.

No.	Capacity.	Diameter, Inches.	Length Spout, Inches.	Price, per Dozen.
10	1 pint	3 $\frac{3}{8}$	12	\$14 00
11	1 quart	4 $\frac{1}{8}$	18	18 00
100	1 pint	3 $\frac{3}{8}$	9	14 00
101	1 quart	4 $\frac{1}{8}$	12	18 00
111	2 quarts	5	10 and 14	20 00

*Discount.....***Tin.**

62	1 pint	3	8 and 10	\$3 75
72	1 $\frac{1}{2}$ pints	4	14	4 25
82	2 pints	4	16	4 75

*Discount.....***With Valve.**

30	1 quart	4 $\frac{1}{2}$	18	\$16 65
40	1 $\frac{1}{2}$ quarts	4 $\frac{1}{2}$	18	18 50

*Discount.....***Engineer's Oiler Sets.**

Made of cold rolled steel; they are heavily electro copper-plated inside. The outside resembles burnished copper.



Fig. D. 1297.

No.	Number of Pieces in Set Including Tray.	Price per Set.	
		With Round Tray.	With Oval Tray.
30	5	\$5 00	.....
40	6	7 00	.....
35	5	.....	\$ 7 00
45	6	.....	10 00

Can also furnish nickel plated if desired, at small additional cost. *Discount.....*

OILERS.

Fig. D. 1298.
Copperized.Fig. D. 1299.
Copperized.
Spring Bottom Oilers.Fig. D. 1300.
Malleable.

No.....	12	13	13A	14	14A	14AA	14B	15	15A	16
Diameter, inches.	2 $\frac{1}{4}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$
Spout, inches. . .	2 $\frac{1}{2}$	3	5	9*	3	5	9*	3	5	9*
Capacity, pints . .	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1	1	1
Price per dozen . .	\$4 50	5 50	6 00	6 50	7 50	8 00	8 50	9 25	9 75	10 50

Spouts interchangeable. *Bent spout.

Discount.....

Malleable Iron.

No.	Diameter, Inches.	Price, Per Dozen.
1	3 $\frac{1}{4}$	\$3 60
2	3 $\frac{3}{8}$	4 00
3	3 $\frac{7}{8}$	4 40

Discount.....

OILY WASTE CANS.

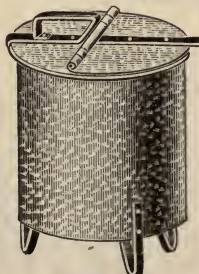
Galvanized.
With Self-Closing Covers.

Fig. D. 1301.

Price, per dozen.....\$18 00

Discount.....

MEASURES.

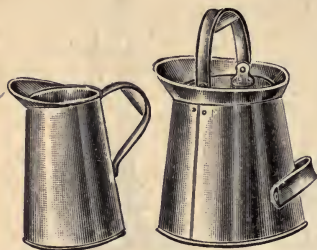


Fig. D. 1302.

Tin.

$\frac{1}{2}$ Pint.....	per doz.,	\$17 50
1 ".....	"	1 85
1 Quart.....	"	2 25
2 ".....	"	3 50
1 Gallon.....	"	5 00

Discount.....

Double Lipped.

2 Gallon.....	per doz.	\$1 40
3 ".....	"	1 50
5 ".....	"	1 75

Discount.....

FUNNELS.

Tin.

Size.	Tube Opening.	Price Per Doz.
$\frac{1}{2}$ Pint	$\frac{3}{16}$ inch.	\$ 0 65
1 ".....	$\frac{1}{4}$ "	80
1 Quart.....	$\frac{1}{2}$ "	1 00
1 " (Rim).....	$\frac{1}{2}$ "	1 50
2 ".....	$\frac{3}{4}$ "	2 00
1 Gallon.....	$\frac{1}{2}$ "	3 00
2 ".....	$\frac{3}{4}$ "	5 00
3 ".....	$\frac{1}{2}$ "	6 50
5 ".....	1 "	9 00
Barrel, with Legs.....	1 $\frac{1}{2}$ "	18 00



Fig. D. 1303.

All sizes larger than quarts are made with rims and corrugated tubes.

Discount.....

CAN SCREWS.

Chace's.

Price Per Gross.



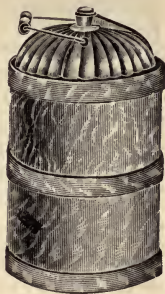
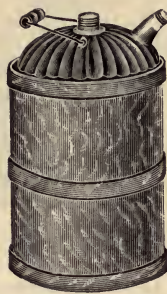
Fig. D. 1304.

Size, Inches.	ZINC.		BRASS.	
	Unlined.	Cork Lined.	Unlined.	Cork Lined.
$\frac{1}{2}$	\$ 4 00	\$ 5 00	\$ 4 50	\$ 5 00
$\frac{3}{4}$	4 50	5 75	5 50	6 00
1.....	6 00	7 50	7 50	8 25
1 $\frac{1}{2}$	8 00	9 75	10 00	10 75
1 $\frac{3}{4}$	12 00	14 50	13 00	14 00
1 $\frac{1}{2}$	16 00	19 00	17 00	18 25
2.....	20 00	23 75	21 00	22 50

Discount.....

OIL CANS.

Wood Jacket.

Fig. D. 1305.
Vented.Fig. D. 1306.
Large Spout.

Capacity.	Price, Each.	
	Vented.	With Large Spout.
1 Gallon, Tin.....	\$0 40	\$0 55
2 " ".....	55	70
3 " ".....	70	90
5 " ".....	85	1 00
10 " ".....	1 50	....

Discount.....



Fig. D. 1307.

Tin.



Fig. D. 1308.

Jacket.

		Per doz.			Per. doz.
1	1 Gallon Common Top.....	\$5 00	1	Gallon.....	\$5 00
2	" " ".....	6 00	2	" " ".....	6 50
		8 00			

Discount.....

CAR OILERS.



Fig. D. 1309.
Oil Can.

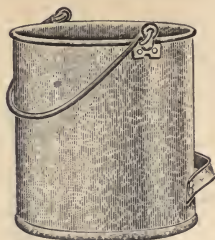


Fig. D. 1310.
Dope Bucket.

Thoroughly made of heavy galvanized iron, with strong wire at top and bottom.
Has malleable iron ears, securely riveted, and strong bail.

10	quart oil can	per doz.	\$ 9 00
12	" " "	"	10 00
10	" dope bucket	"	12 50
12	" " "	"	13 50
16	" " "	"	15 50

Discount.....

PAILS.

Contractor's Heavy Galvanized Cement Pails.



Fig. D. 1311.

Heavy steel bands, securely riveted at top and bottom. Also half inch wide steel cross pieces on bottom, which makes it an extra strong pail for cement and general contracting work. Capacity 14 quarts, weight per dozen, 110 pounds. Price, per doz.....\$25 00

Discount.....

PAILS.

Wood.

Fig. D. 1312.
Common.Fig. D. 1313.
J. I. C.

Common, 3-hoop	per doz.,	\$3 75
J. I. C., Horse pail	"	8 00
<i>Discount</i>		

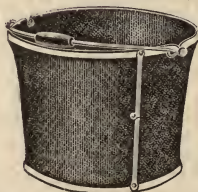
Galvanized.



Fig. D. 1314.

10-quart	per doz.	\$4 50
12 "	"	5 00
14 "	"	5 50
<i>Discount</i>		

DUPLEX FOLDING PAILS.

Fig. D. 1315.
No. 12 open.Fig. D. 1316.
No. 12 folded.

Made of heavy brown canvas thoroughly water-proofed. Metal parts spring steel rust-proofed. Have wire handles and are light, durable and lasting.

They open and fold quickly and easily and are the only collapsible or folding pails that you can throw water with.

They are particularly adapted for use on fire apparatus, as they occupy little space. Simple, rigid, strong.

Nos.	Capacity.	Folds into.	Each
12	10 quarts.	13½x6x2½ inches.	\$1 50

GENUINE INDURATED FIBRE WARE.

Pails.

No hoops or staves. All one piece. Light, durable, tasteless, odorless. Cannot warp, shrink, swell, leak or rust.



Fig. D. 1317.
Star—Standard Size.

Description.	Depth, Inches.	Diam. at Top, Inches	Capacity, Quarts.	Crate Con- tains, Dozen	Crate Weights Lbs.	Price, Per Dozen.
Star, standard.....	8½	11	10 to 12	13	25	\$3 00
Buggy, low sides...	6	10½	6	13	18	4 00
Deck, heavy bales and ears	8½	11	10 to 12	13	34	5 80
Railroad or factory.	11	11	14	13	34	6 60

Discount.....



Fig. D. 1318.
Fire—Round Bottom.



Fig. D. 1319.
Special Fire.

Description.	Depth, Inches.	Diam. at Top, Inches.	Capacity, Quarts.	Crate Con- tains, Dozen.	Crate Weights, Pounds.	Price, Per Dozen.	Labeled with Under- writers' Label.
Fire, round bottom.	11	11	12	13	26	\$7 00	\$9 00
Special fire.....	13	8	10	13	30	7 40	9 00
Star, fire, flat bottom	8½	11	12	13	25	4 50	6 60
Railroad, fire.....	11	11	14	13	34	7 40	9 60

Discount.....

Keelers or Refrigerator Drips.

No.	Depth.	Diam. at Top, Inches.	Crate Contains Dozen.	Crate Weights, Pounds.	Price, Per Dozen.
0	6	23	13	46	\$13 20
A	7	20	13	68	12 00
B	7	18½	13	58	11 40
C	7	17½	13	55	10 80
1	6½	17	13	48	10 20
2	6	15	13	48	9 00
3	5	13	13	29	7 50
4	4	12	13	22	6 40

Discount.....

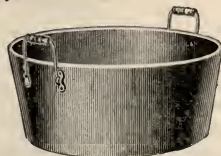


Fig. D. 1320.

GENUINE INDURATED FIBRE WARE.

WATER COOLERS.

"XXth Century."

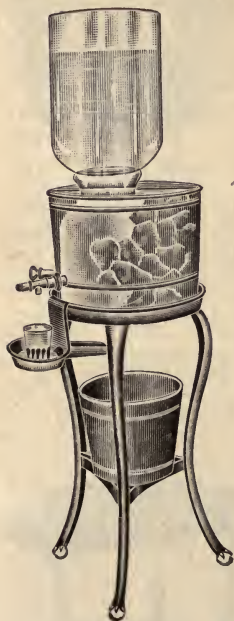


Fig. D. 1321.
Style No. 570.

The "XXth Century" bottle cooler comprises an ice container, a white porcelain water jar, equipped with faucet, and a bottle or demijohn which contains the main supply of liquid to be dispensed. The ice container is made of indurated fibre ware, which is a non-conductor, hence reduces ice consumption to a minimum. These ice containers are strong, yet light in weight, and are moulded in one piece, with no metal hoops or parts to rust and no cracks or narrow spaces to collect dust and filth.

The water jar rests in a jacket of ice, so to speak, within the ice container.

The faucets are arranged in a most satisfactory and sanitary fashion, without joints for collection of dirt and sediment. From them a free flow obtained—the $\frac{1}{2}$ -inch faucet will fill an 8-ounce glass in three seconds, the $\frac{3}{4}$ -inch faucet in two seconds. The water or other liquid, passes direct from the bottle or demijohn into the porcelain jar, and thence directly through the faucet to the glass without going through coils where sediment can lodge. It is entirely surrounded by ice, but never comes in contact with it.

Description.	Ice Capacity.	Water Capacity.	Weight without Bottle.	Price without Bottle.	Bottles.	
					Wt., Lbs.	Price, Each.
Mahogany....	15 to 20 lbs.	3 or 5 gal.	35 lbs.	\$ 9 00	3 gal.-12½	\$1 50
Decorated.....	15 to 20 lbs.	3 or 5 gal.	35 lbs.	10 00	5 gal.-18	2 00
White.....	15 to 20 lbs.	3 or 5 gal.	35 lbs.	10 50	.....	.....
Golden Oak...	15 to 20 lbs.	3 or 5 gal.	35 lbs.	11 00	.....	.....

Can furnish any color or finish desired at special prices.

Discount.....

WATER COOLERS.



Fig. D. 1322.

No.	Price, Each.	Capacity.		Extreme Height, Inches.	Diameter of Base, Inches.
		Ice, Lbs.	Water, Gallons		
804	\$5 00	5	2½	24½	12½
806	6 00	6	3½	28	14½
808	7 50	8	5	30	16
810	9 00	20	6	33½	16½
812	10 50	26	7	34½	18

Discount.....

COOLER STANDS.

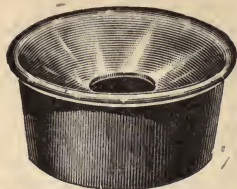
No.	Price, Each.	Diameter of Top, Inside Rim Inches.	Extreme Height, Inches.	Shipping Weight, Pounds.
615	\$9 00	15	30	50
616	9 75	16½	30	60
618	10 75	18	30	70

Discount.....



Fig. D. 1323.

SPITTOONS.

Fig. D. 1324.
All-Fibre.Fig. D. 1325.
With Indu-Namel Top.**Indurated Fibreware.**

Indurated fibre is light, but strong.

Is absolutely moisture-proof and not affected by hot water or chemicals.

Will stand hard usage, dark in color, easily cleaned, body moulded in one piece, will not crack, warp or leak. Won't scratch polished floors.

Tops are removable and made to protect edges.

All-Fibre.

Body and top both of fibre. A plain, neat, serviceable spittoon. Inexpensive and widely used.

No.	Height.	Diameter.	Crate Weighs.	Price Doz., Complete.	Price Doz., Tops Only.
1	5½ in.	13 in.	30 lbs.	\$9 20	\$3 20
2	5½ in.	11 in.	19 lbs.	7 20	2 80
3	4½ in.	9 in.	13 lbs.	6 20	2 40

Indu-Namel Brown Enameled Steel Tops—Fibre Body.

Top matches body in color, and will not show tobacco stains.

No.	Diameter.	Crate Weighs.	Price Doz., Complete.	Price Doz., Tops Only.
1	13 in.	30 lbs.	\$10 50	\$4 00
2	11 in.	19 lbs.	8 60	3 75
3	9 in.	13 lbs.	7 80	3 30

White Enameled Steel Tops—Fibre Body.

White gives the appearance of cleanliness. This is a specially neat looking spittoon, very strong and easily cleaned.

No. 1	13 in.	30 lbs.	\$11 50	\$5 00
No. 2	11 in.	21 lbs.	9 00	4 20
No. 3	9 in.	15 lbs.	8 00	3 50

Polished Brass Tops—Fibre Body.

An ornamental spittoon suitable for hotel corridors and offices. One of the most popular spittoons in the line.

No. 1	13 in.	30 lbs.	\$15 00	\$8 00
No. 2	10½ in.	19 lbs.	10 80	5 70
No. 3	8½ in.	14 lbs.	8 70	4 20

Nickel Plated Tops—Fibre Body.

No. 1	13 in.	30 lbs.	\$16 00	\$9 00
No. 2	10½ in.	19 lbs.	11 40	6 00
No. 3	8½ in.	14 lbs.	9 00	4 50

Bottoms Only (Fibre).

No.	Crates Weigh.	Price per Doz.	No.	Crates Weigh.	Price per Doz.
1	21 lbs.	\$6 00	3	10 lbs.	\$4 00
2	15 lbs.	4 50			

Discount.....

CUSPIDORS.

Seamless. Self-righting. Non-breakable. Wrought steel. Assorted colors outside. Gold banded. White enameled inside.



Fig. D. 1326.

No.	Size, Inches.	Price, Per Doz.
14	8 $\frac{1}{2}$ x 4 $\frac{1}{2}$	\$ 7 50
44	9 x 5 $\frac{1}{2}$	10 00

Discount.....

Fig. D. 1327.
Iron.Fig. D. 1328.
Brass.

Iron.

Self-righting, iron, porcelain lined, outside painted and striped. . per doz., \$8 00

Discount.....

Brass.

No.	Diameter, Inches.	Height, Inches	Finish.	Price, Per Doz.
73	7 $\frac{1}{2}$	8	Polished brass	\$26 00
173	7 $\frac{1}{2}$	8	Nickel-plated	29 75
74	10	11	Polished brass	46 50
174	10	11	Nickel-plated	50 50

Discount.....

TORPEDOES.

Fig. D. 1329.
Steel Spring.Fig. D. 1330.
Granite.Fig. D. 1331.
Wedge Shape.

Patent Spring.....	per gross	\$5 00
Patent Granite Covered.....		5 00

The gritty or granite covering of this Torpedo prevents the wheel from shoving it along, or from the rail, and renders explosion *absolutely certain* under all circumstances.

Wedge Shape.....	per gross,	\$3 00
Round Lead Strap	"	2 50
Round Tin Strap.....	"	2 00

Discount.....

TORPEDO ADJUSTER.

A simple, device for placing Torpedoes on the rail while the train is in motion at any rate of speed.

Price each..... \$3 50

Discount.....

FUSEES OR TORCHES.



Fig. D. 1332.

For preventing rear end collisions. Wind, snow or rain will not affect them. Displays a brilliant red light for 5, 10 or 15 minutes. Perfectly safe to handle, as they can only be lighted by the chemical surface provided on each torch.

Price, 5 minute.....	per gross,	
" 10		"
" 15		"

BUNTING.

Standard Bunting, Red, White, Blue and Green.....	per piece,
Railway " " " " " ".....	"
Army " " " " " ".....	"
Navy " " " " " ".....	"
Anchor " " " " " ".....	"
Signal " " " " " ".....	"

SIGNAL FLAGS.

Any color, 18x20 inches.....	per doz.,
" 18x24	"

Prices upon application.

THERMOMETERS.

For Railway Coaches.

Fig. D. 1333.
No. 6030.Fig. D. 1334.
No. 6031.Fig. D. 1335.
No. 6032W.Fig. D. 1336.
No. 6033W.

No.	Approximate scale range, 0° to 120° or 150° F.	Price per dozen. ½ dozen in box.	
		6 inch.	8 inch.
6030	Brass oxidized scale, silver deposited figures, spirit tube mounted from back for protection. . . . .	.....	\$18 00
6031	Wood back, oak or cherry, brass oxidized scale, white filled figures, sunk mercury tube.	\$16 00	18 00
	Add to list price for solid mahogany	5 00	6 00
	Spirit tubes same price as mercury, designate by letter "S."		
6032	Radial scale, brass oxidized finish, nickel ends, brackets for attaching, spirit tube. . . . .	.....	30 00
6033	Same as No. 6032 with ring band for attaching..	.....	30 00

Discount.....

Track Laying
Thermometer.

No. 6036. 6½-inch brass oxidized scale, etched degree lines, mercury tube, approximate scale range, 0° to 170°, Morocco covered case. \$5 00

Fig. D. 1337.
No. 6036.

Discount.....

DOOR CHECKS.

Yale and Blount Door Checks.

In recent years, door checks have come to be recognized rather as a necessity than a luxury, and there is scarcely a building of any importance, public or private, in which door checks are not to be found.

The only successful checks are those of the liquid type, and of these the "Blount" is the earliest, best, and most popular. It is made in six sizes, adapted for all conditions, and can be used on any door.



Fig. D. 1338.

Size	Description.	Price Each.	Size	Description.	Price Each.
1	For very light doors..	\$3 25	4	For heavy inside and ordinary outside doors.....	\$6 00
2	For light inside doors.	4 25	5	For outside doors of medium size.....	8 00
3	For inside doors of medium size.....	5 00	6	For heavy outside doors.....	10 00

Discount.....

The *Blount Holder-Check* embodies a recent improvement whereby the door may be *held open* at any desired angle, and again released by a slight pull on the door. It is made in four sizes, as follows:

Size.	Description.	Size.	Description.
101	For very light doors.	103	For inside doors of medium size.
102	For light inside doors.	104	For heavy inside and ordinary outside doors.

Coach Door Checks. Special checks for railway coach doors are now in almost universal use, ensuring the prompt closing of the door without slamming and breaking of glass, or damage to door. Made in three sizes:

Size.	Description.	Size.	Description.
R-1	For toilet, compartment and drawing room doors.	R-2	For communicating doors.
		R-3	For end doors.

Checks are furnished regularly in gold bronze.

At the same price (when so ordered) they will be supplied in silver bronze, or imitation of Bower-Barff.

At an additional price they will be furnished plated in brass, bronze, nickel, copper, oxidized silver, or any other finish desired, either polished or unpolished. Or in solid brass or bronze, if desired.

Prices upon application.

STOVES.

Station.

"Volcano."



Fig. D. 1339.

The drum is provided with a heavy cast iron flue plate, which compels the heat to go to the top, and then descend to pipe collar, which adds largely to the heating capacity.

No.	Height Over All.	Diameter of Fire Pot at Feed Door.	Weight, Pounds.	Price, Each.
112	5 feet 3 inches.	12 inches.	150	\$18 50
114	5 " 4 1/2 "	14 "	210	23 00
116	5 " 6 "	16 "	245	26 50
118	5 " 9 "	18 "	315	31 00
120	6 " 2 "	20 "	410	38 00
122	6 " 6 "	22 "	525	48 00

Discount.....

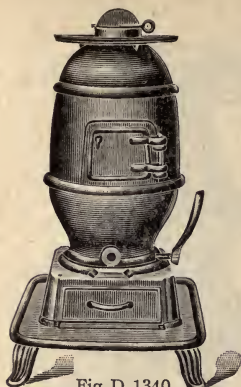


Fig. D. 1340.
With Dome and Shelf.

STOVES.

Station Stoves.

"Mogul."

For general use as a station stove for railroads, or for general heating, hard or soft coal, wood or natural gas.

All stoves are furnished with ash pan, shaking and dumping grate, lever, shelf and damper, without extra charge.

Closed base (see Fig. D. 1343) furnished in place of legs when so specified, without extra cost.



Fig. D. 1341.
With Flat Top.

No.	Diameter, Inches.	Height, Inches.	Weight, Pounds.	Price.	
				With Dome and Shelf.	Flat Top.
1	15	40	300	\$18 00	\$19 50
2	17	45	350	21 00	22 50
3	19	50	450	27 00	29 50

Discount.....

Caboose Stoves.

"Mogul."

Same as station stoves described above in every particular, except that for caboose service, latches on fire door and on ash pan are furnished, lugs are also provided for rods, so that the stove may be bolted to the floor.

We do not furnish rods.

The new style closed base (Fig. D. 1343) is clean and sanitary, and avoids the danger of fire through broken leg upsetting stove. No extra cost. Price same as Fig. D. 1342.

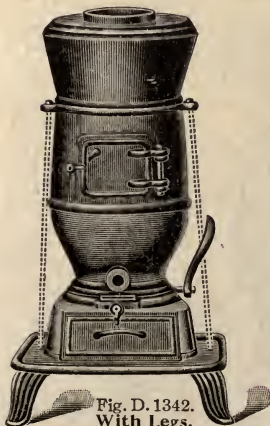


Fig. D. 1342.
With Legs.

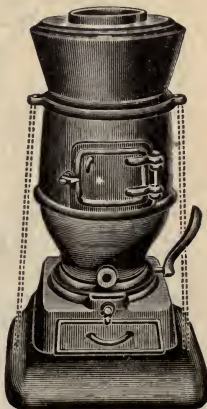


Fig. D. 1343.
With Closed Base.

No. 1.....	\$21 00	No. 2.....	\$24 00
No. 3.....			30 00

Discount.....

STOVES.

Cone Disk. "Chilson."



Fig. D. 1344.
Station.

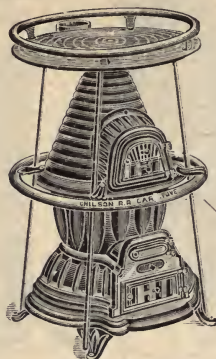


Fig. D. 1345.
Car.

Fig. D. 1344.—For R. R. stations, work-shops, offices, halls, etc.

Fig. D. 1345.—For car or caboose. Can be used with or without top rail.

No.	Diameter Pot, Inches.	Height of Stove, Inches.	No. of Boiler Holes.	Price.	Price of Rods Extra, Per Set.	Price of Top Rail, Extra.
3	12	35	One 7 in.	\$18 00	\$2 00	\$1 00
4	15	38	One 8 in.	20 00	2 00	1 50
5	18	45	One 9 in.	30 00	.....	.....
6	22	56	One 9 in.	45 00	.....	.....

Discount.....

COAL HODS.

Open Pattern.



Fig. D. 1346.

19 inch, galvanized	.....	per doz.,	\$6 50
18 " " "	.....	"	5 00
17 " " "	.....	"	4 50

Discount.....

FREIGHT CAR HEATERS.**"Milwaukee."****Constructed of heavy sheet metal and steel.**

Will burn continuously for from 48 to 72 hours (according to supply of oxygen in car) without any attention whatever.

Will not become heated (except such parts as come in direct contact with flame) and therefore requires no water to keep cool.
Can be re-filled and looked after (as occasion may require) without taking down from hanging position.

By means of improved hanger arrangement and reservoir construction, heater will swing to and fro in nearly perfect, horizontal maintained position and without swishing of oil.

Being suspended on cushion springs, enables it to withstand the severest jolt with perfect safety—overturning or wreck of car excepted.

Is provided with improved radiator to force heat outward at sides and "low down," instead of concentrating upward through top of cylinder or chimney. This method insures better radiation and complete circulation of warmed air.

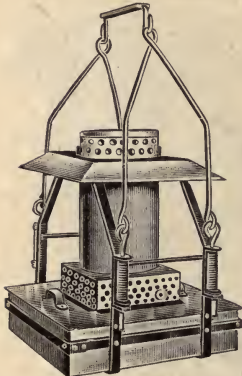


Fig. D. 1347.

No.	Diameter of Wick.	Capacity.	Price, Each.
3	3 inches.	5 gallons.	\$20 00
4	4 inches.	6 gallons.	20 00

Discount.....

"Economy."

They are used for heating cars in transit; for heating cars before loading; for heating cars which reach destination when weather is too cold to admit of their being unloaded—thus saving the trouble and expense of running such cars into round houses.

Inside the burner is a water tube 3 inches in diameter, fed from a water reservoir, preventing the overheating of the metal parts and providing for the immediate extinction of the flame should the heater be overturned. The oil reservoir holds two gallons. This will maintain a steady flame for about twenty-four hours.

When used in refrigerator cars the heaters are placed in the ice tanks, one at each end, and are attended to without breaking seals. They are readily raised and lowered through the ice hatches. When used in box cars they are placed between the doors, one or two being used according to the temperature.

Price, each.....\$15 00

Discount.....

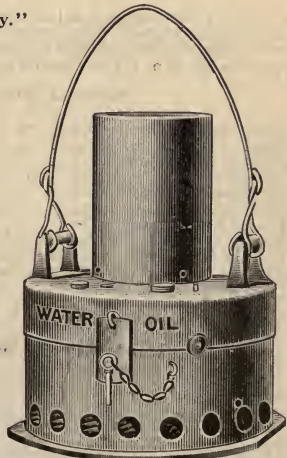


Fig. D. 1348.

STEAM FEED COOKER.



Fig. D. 1349.

The trimmings include base, grate, hood, steam gauge, glass water gauge, two gauge cocks, blow-off valve, pump or injector fitted for supplying the boiler with water, safety-valve, 2½ feet of suction hose, 3 feet of steam pipe with valve to convey steam to barrel or vat for cooking feed or boiling water.

Table of Dimensions and Price List.

Diameter of Boiler, inches.....	20
Height of Boiler, inches.....	44
Number of 2-inch Tubes.....	13
Length of Tubes, inches.....	30
Thickness of Shell, inches.....	⅝
Thickness of Heads, inches.....	⅝
Height over all, inches.....	58
Weight complete, pounds.....	400
Price of Bare Cooker with Fire-box Liner.....	\$40 00
Price of Safety Valve.....	1 30
Price of Water Gauge.....	1 50
Price of Gauge Cocks.....	1 20
Price of Steam Gauge.....	2 68
Price of Blow-off Cock.....	1 08
Price of either Hand Pump or Injector.....	4 60
Price of Outlet Valve and Pipe.....	1 00
Price of Grate.....	1 50
Price of Hood.....	1 34
Price of Base.....	3 80
Price of complete Cooker.....	\$60 00

Discount.....

OPEN TYPE FEED WATER HEATER.

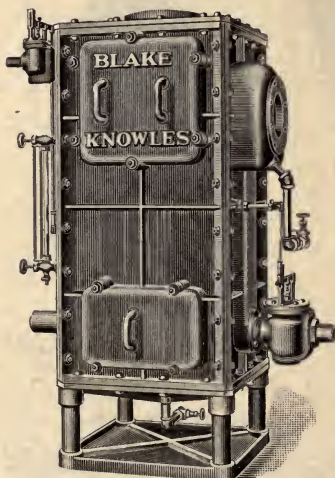


Fig. D. 1350.

Horse Power.	Shipping weight.	Exhaust Inlet.	Exhaust Outlet.
100	1350	5 in.	5 in.
150	1550	6 in.	6 in.
200	1675	6 in.	6 in.
300	2000	7 in.	7 in.
400	2300	8 in.	8 in.
500	3100	8 in.	8 in.
750	4500	10 in.	10 in.
1000	5500	12 in.	12 in.
1250	6500	12 in.	12 in.
1500	8000	14 in.	14 in.
2000	9800	14 in.	14 in.
2500	10300	16 in.	16 in.
3000	12500	16 in.	16 in.

Prices upon application.

We can also quote prices and give additional information on the vertical and horizontal closed type feed water heater on a large range of sizes. Each type has its advantages and a careful study of conditions should be made before selecting the type to be used. When writing for quotations or information, answers to the following questions are required so we may make prompt and accurate reply.

What is the horse power of boilers which the heater will be expected to supply?

What amount of exhaust steam is available for heating? Give pounds per hour.

Is the exhaust steam to be also used for a heating system?

What back pressure is carried on the exhaust line?

What is the source and character of water supply?

Open heaters are made both right and left with regard to position of the exhaust inlet when facing the front. Specify which you will require.

IMPROVED SAND DRYERS.

Johnson & Hartwell's Patent.

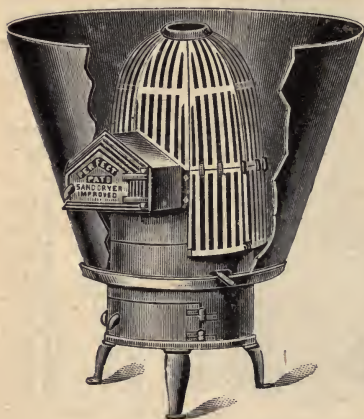


Fig. D. 1351.

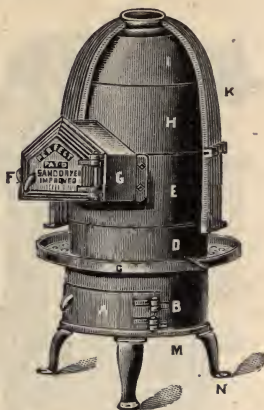


Fig. D. 1352.

This dryer consists of a furnace with a vertical grating surrounding and standing out from the furnace, leaving an open hot air chamber between the grating and the furnace from top to bottom, so that as soon as the sand is dry it will drop through the grating into the open hot air chamber and out through the perforated ring at the bottom to the floor, leaving the wet sand porous and more exposed to the hot air in the chamber, which in turn dries, and so on.

With the same labor, fuel and time, it will dry double the amount of sand of any other style of sand dryer in use.

The durability of this dryer far exceeds any other dryer on the market owing to the fact that the sand cannot bake into a hard mass next to the furnace and allow the intense fire to burn out the castings.

No. 1.	Price.....	\$80 00
" 2.	"	50 00

Repair List.

A.—Ash Door.	H.—Center Ring.
B.—Ash Ring.	I.—Dome.
C.—Perforated Ring.	K.—Outside Grating.
D.—Lower Section Fire Ring.	L.—Fire Grate.
E.—Upper Section Fire Ring.	M.—Bottom Plate.
F.—Fire Door.	N.—Legs.
G.—Door Frame.	

In ordering parts for repairs, designate by the letter parts wanted and always give number of dryer.

STAR WHITE WASHING, PAINTING AND SPRAYING MACHINES.



Fig. D. 1353. Style A.

This cut represents our Style "A" machine, the largest made. B, C & D machines are constructed along the same line but have smaller pumping cylinder and air chamber and lighter frame.

Style.	Capacity Equal to work of	Gross Weight, Lbs.	Price, Each.
A	30 men with brushes	100	\$44 00
B	20 men with brushes	85	38 00
C	16 men with brushes	80	31 00
D	10 men with brushes	75	25 00

Discount.....

This illustration represents our Style "F" machine, consisting of a heavy galvanized iron tank, provided with a specially designed spray pump properly fitted in same. The whole is mounted on an extra heavy saddle truck with wheels 7 inches in diameter with 2-inch face.

Style.	Capacity Tank.	Capacity Equal to Work of	Gross W't, Lbs.	Price, Each.
E	30	16 men with brushes...	150	\$40 00
F	20	12 men with brushes...	110	\$23 00

Discount.....



Fig. D. 1354. Style F.

Each machine has the following equipment: One spray pipe complete with $\frac{1}{4}$ -inch cock and spray nozzle, one extra spray tip, 200-pound pressure gauge, galvanized sieve, wrench, $\frac{3}{4}$ -inch discharge cock, suction hose and $\frac{1}{4}$ -inch discharge hose.

TARRED ROOFING FELT.

No. 1 weighs approximately 2 pounds to square yard.

No. 2 weighs approximately 1½ pounds to square yard.

No. 3 weighs approximately 1 pound to square yard.

Width 32 inches. Weight approximately 50 pounds per roll.

Prices upon application.



Fig. D. 1355.

PREPARED ROOFING.

"Calumet" Brand.

The base of this roofing is a thick, uniform, closely formed sheet of pure wool felt. This felt is thoroughly saturated with a mixture of pure asphalt and mineral rubber, which in themselves render the sheet impervious to moisture. The fabric is then treated on both sides with our waterproof composition and coated with white Silica sand, which is thoroughly pressed into the waterproof composition by passing through heavy press rolls and which acts on the under side as a protection from condensation, acids, gases and other vapors, and on the upper or exposed side as a thorough coat or shield against the ravages of time and the elements.

This roofing is made in three weights, designated as one, two and three-ply, all 32 inches wide. Each roll contains 108 square feet, sufficient to cover 100 square feet with full allowance for 2 inches lap. The rolls are attractively wrapped and labeled and the ends heavily capped with patent metal fasteners to protect the edges.

For applying each square, 1 pint of special lap cement and 2 pounds of broad head nails, or caps and nails, are required. These are packed in center of roll, making a complete package ready for shipment.

One-ply, per square.....	\$2 25
Two-ply, per square.....	3 25
Three-ply, per square.....	4 00

Discount.....

This roofing is especially economical because already coated when you buy it. The outside, under extreme conditions, may need refinishing and we suggest that when it may seem necessary, it be given a coat of our Special Coating. It will protect the fabric and make the roofing much more durable and elastic.

PREPARED ROOFING.

Rubber Composition.

This prepared roofing is made of wool felt, thoroughly saturated with a mixture of asphalt and mineral rubber, which in themselves render the sheet impervious to moisture. The fabric is then treated on both sides with a rubber composition, which acts on the underside as a protection from condensation of acids, gases and other vapors, and on the upper or exposed side, as a thorough coat or shield against the elements.

This roofing is made in three weights, designated one, two and three ply, all 36 inches wide. Each roll contains 216 square feet, sufficient to cover 200 square feet, with allowance for 2-inch lap.

Weights of Roofing.

One ply, 30 to 32 pounds per 108 square feet.

Two ply, 40 to 42 pounds per 108 square feet.

Three ply, 50 to 52 pounds per 108 square feet.

The above weights do not include the trimmings.

For applying each square is required one pint of lap cement, one pound of nails and three-quarters of a pound of tin caps.

These trimmings are packed in the center of each roll, making a complete package ready for shipment.

Prices per Square Complete.

One ply, per square.....	\$2 25
Two ply, per square.....	3 25
Three ply, per square.....	4 00

Discount.....

LAP CEMENT.

Is a liquid cement, very adhesive and having good cementing qualities, used for cementing the laps and joints of this roofing and painting the seams and nails. One pint is required for each square of roofing.

ROOF COATING.

Is composed of about the same materials as are used in saturating and finishing this roofing, is a quick dryer but does not become brittle or crack. Contains no coal tar. Used for painting our roofing, also for tin, iron, and other composition roofings, has a covering capacity of about 200 square feet to the gallon. Also suitable for repairing roofs and cementing seams.

Prices of Coating and Lap Cement.

Barrels.....	\$0 90 per gal.	1-gallon packages.....	\$1 10 per gal.
Half barrels.....	95 per gal.	Half-gallon cans.....	1 20 per gal.
5 and 10-gallon packages	1 00 per gal.	1-quart cans.....	1 40 per gal.

Discount.....

BUILDING PAPER.

Red and Gray Rosin Sized Sheathing.

In rolls of 500 square feet, 36 inches wide, weighing approximately 25, 30, 35 and 40 pounds to the roll.

Prices upon application.

COAL TAR.**In Barrels.**

Price.....per bbl.....

MARLINE.**In Balls and Coils.**

Price.....per lb.....

OAKUM.**In 50-lb. Bales.**

Price.....per bale.....

LYE.**Lewis' Concentrated.**

Concentrated.....per case.....

BORAX.

Refined.....Per lb.....

WELDING COMPOUND.**Cherry Heat.**

Boxes, lbs.....	100	50	25	10	5
Per lb.....	\$0 14½	\$0 14½	\$0 14½	\$0 15	\$0 15

*Discount.....***GLAZIERS' DIAMONDS.**

Fig. D. 1356.
(Enlarged Cut.)

For plate glass.....\$15 00 to \$25 00
 For double-thick glass.....7 50 to 10 00

DIXON'S PLUMBAGO OR GRAPHITE.**Lubricating.**

No.	Put up in.	Packed.	Price.
632	1 pound paper cans....	36 in case	\$0 20 each
633	5 pound tin cans screw top.....	1-5-10 in case	85 each
634	10 pound tin cans screw top.....	1-2-5 in case.	1 60 each
644	25 pound paper bag....	In case.	15 lb.
645	50 pound paper bag....	In case.	14½ lb.
646	100 pound keg.....	.....	14 lb.
647	200 pound half barrel....	.....	14 lb.
647	350 pound barrel.....	.....	12 lb.

Waterproof Graphite Grease.

For wire ropes and cables. Will resist running water.

10 pound firkin, each.....	\$ 1 50
25 pound firkin, each.....	3 50
50 pound keg, each.....	6 50
100 pound keg, each.....	12 00
400 pound barrel, per pound.....	10

Graphite Pipe Joint Grease.

Being several times greater in bulk than an equal weight of red lead, makes it far more economical to use.

It does not "set," and joints can remain months or years and then will yield to the ordinary pressure of the tongs, rendering unnecessary the breaking of joints couplings and tools.

No.	Put up in.	Packed.	Price per lb.
693	1 pound cans.....	36 in case.	\$0 20
694	5 pound cans.....	12 in case.	18
695	10 pound cans.....	6 in case.	15
696	25 pound cans.....	1 in case.	14
697	50 pound kegs.....	.....	13½
698	100 pound kegs.....	.....	13

Silica-Graphite Smoke-Stack and Boiler Front Paint.

For locomotive and steamboat stacks, smoke arches, ash pans, boiler fronts and other iron work.

Prices, Thick, Ground in Oil.

10 pounds.....	per lb., \$0 15
25 pounds.....	" 14
50 pounds.....	" 13½
100 pounds.....	" 13
450 pounds (barrel).....	" 12

Prices, Thinned, Ready Mixed.

5 gallons, in kegs.....	per gal., \$1 45
10 gallons, in kegs.....	" 1 40
25 gallons, in half barrels.....	" 1 35
50 gallons, in barrels.....	" 1 30

CAR SEALS.

Wire and Lead.



Fig. D. 1357.

No. 123.....per M.....



Fig. D. 1358.

No. 2.—Twisted Wireper M.....

Tin.

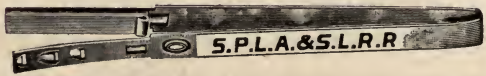


Fig. D. 1359.

Patent Self Sealingper M.....



Fig. D. 1360.

No. 23.—Tin.....per M.....

SEALING PRESSES.



Fig. D. 1361.

For No. 132 seals, price each.....\$.....

Prices upon application.



Fig. D. 1362.

Japanned, 10 inches long, each.....\$.....

Nickel-plated, 6 inches long (pocket size), each.....

Prices upon application.

SWITCH AND FREIGHT CAR LOCKS.



Fig. D. 1363.

	Rough.	Polished.
No. 6, extra heavy, per doz.....	\$16 50	\$19 25
No. 7, per doz.....	13 75	16 50
No. 8, retaining key.....	18 00	21 00

Prices do not include keys.

Discount.....

Brass switch and car keys.....per doz., \$2 25

Discount.....

DOOR CHAINS.



Fig. D. 1364.

For Baggage Car Doors, Etc.

Per doz.....\$20 00

Discount.....

BADGES.

German Silver, Nickel-Plated Hat Badges.



Fig. D. 1365.



Fig. D. 1366.



Fig. D. 1367.



Fig. D. 1368.



Fig. D. 1369.

Cuts $\frac{1}{2}$ actual size.

Showing the various shapes of Badges and style of lettering generally used.
 We can furnish any other style upon receipt of sample. In ordering state
 style of badge and letter required.

Nickel-Plated per doz.,

Nickel-Plated, with Elastic Band "

Prices upon application.

METALLIC PATTERN LETTERS AND FIGURES.

Fig. D. 1370.
Roman.Fig. D. 1371.
Sharp Face Gothic.
White Metal.Fig. D. 1372.
Flat Face Gothic.

Size, Inch.	Price, Each	Size, Inch.	Price, Each.	Size, Inch.	Price, Each.
$\frac{1}{2}$	\$0 03	$\frac{1}{2}$	\$0 03	$1\frac{1}{2}$	\$0 15
$\frac{3}{8}$	02	$\frac{3}{8}$	04	$1\frac{1}{4}$	20
$\frac{1}{4}$	02	$\frac{1}{4}$	04	2	30
$\frac{3}{16}$	02	$\frac{3}{16}$	05	$2\frac{1}{4}$	40
$\frac{1}{8}$	02	$\frac{1}{8}$	06	3	50
$\frac{3}{16}$	02 $\frac{1}{2}$	1	07	4	60
$\frac{1}{4}$	03	$1\frac{1}{4}$	10	.....	.....

Discount.....

STEEL LETTERS, FIGURES AND STAMPS.



Fig. D. 1373.

These letters and figures are made of Jessops' English steel, properly tempered. No extra charge for steel or forging for alphabets or figures of any size, or stamps under $\frac{1}{2}$ inch, if plain. Larger sizes and irregular shapes, cost of steel and forging will be added.

Size.	Jessop Steel			*Cold Rolled, Machine Made.			Size.	Jessop Steel			*Cold Rolled, Machine Made.		
	Price per Alphabet.	Price per Set Figures.	Price per Single Letter or in Stamp.	Price per Alphabet.	Price per Set Figures.			Price per Alphabet.	Price per Set Figures.	Price per Single Letter or in Stamp.	Price per Alphabet.	Price per Set Figures.	
$\frac{1}{2}$	\$9 00	3 00	0 35	4 50	1 50		$\frac{1}{2}$	10 00	3 50	0 40	4 50	1 50	
$\frac{3}{8}$	7 50	2 50	30	4 50	1 50		$\frac{3}{8}$	11 50	4 00	45	5 25	1 75	
$\frac{1}{4}$	6 50	2 25	25	3 00	1 00		$\frac{1}{4}$	13 00	4 50	50	7 50	2 50	
$\frac{3}{16}$	6 50	2 25	25	3 00	1 00		$\frac{3}{16}$	15 50	5 25	60	10 50	3 50	
$\frac{1}{8}$	6 00	2 25	25	3 00	1 00		$\frac{1}{8}$	18 00	6 00	70	13 50	4 50	
$\frac{3}{16}$	7 00	2 50	30	3 00	1 00		$\frac{3}{16}$	21 00	7 00	85			
$\frac{1}{4}$	8 00	2 75	35	3 50	1 25		$\frac{1}{4}$	26 00	8 50	1 00			
$\frac{3}{8}$	8 00	2 75	30	4 00	1 25		$\frac{3}{8}$	31 00	10 00	1 20			
$\frac{1}{2}$	10 00	3 50	40	4 25	1 40		$\frac{1}{2}$						

Discount.....

*Not recommended for stamping on steel.

BURNING BRANDS.

Patent Improved.

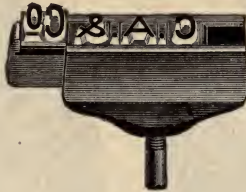


Fig. D. 1374.

These branding irons are constructed so as to hold separate letters in forming any word or name.

Should any letters become damaged or burned out, they can be replaced at any time at small expense, and the brand always kept in good order.

Brands, with Name Complete.

		$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.
Brands of	1 letter.....	\$0 70	\$0 70	\$0 70	\$1 00	\$1 25	\$1 25
"	2 ".....	85	85	85	1 40	1 65	1 75
"	3 ".....	1 00	1 00	1 00	1 70	1 85	2 00
"	4 ".....	1 00	1 00	1 00	2 00	2 30	2 50
"	5 ".....	1 15	1 20	1 25	2 50	3 00	3 25
"	6 ".....	1 30	1 40	1 50	2 75	3 20	3 50
"	7 ".....	1 45	1 60	1 75	3 25	3 90	4 25
"	8 ".....	1 60	1 80	2 00	4 00	4 10	4 50
"	9 ".....	1 75	2 00	2 25	4 50	4 80	5 25
"	10 ".....	1 90	2 20	2 50	4 75	5 00	5 50
"	11 ".....	2 05	2 40	2 75	5 00	5 70	6 25
"	12 ".....	2 20	2 60	3 00	5 25	5 90	6 50
"	13 ".....	2 35	2 80	3 25	5 50	6 60	7 25
"	14 ".....	2 50	3 00	3 50	5 75	6 80	7 50
"	15 ".....	2 65	3 20	3 75	.....	.....	.....

Discount.....

Single Letters or Figures.

$\frac{1}{4}$ inch.....each, \$0 08 | $\frac{3}{8}$ inch.....each, \$0 10 | 1 inch.....each, \$0 25
 " ".....09 | " ".....20 | " ".....30

Figures, same price. Periods, half price.

Discount.....

STEEL LOG STAMPS.

For marking ends of logs, timber, etc., made of the best steel and warranted.

$\frac{1}{4}$ in., per letter.....\$0 75 | $1\frac{1}{4}$ in., per letter.....\$1 25
 1 " ".....1 00 | " ".....1 50

50 cents per lb. additional for steel forging.

Borders, \$1.00 extra. Stars, same price as letters.

Duplicate stamps, in lots of one dozen or more, are cast in iron, and can be furnished at greatly reduced prices.

The above stamps are for marking the ends of logs. Stamps for cutting into the side of logs are made sharp face, and must be expressly mentioned when for that purpose.

Discount.....



Fig. D. 1375.

LOCOMOTIVE HEAD LIGHTS.

Standard Round Case.

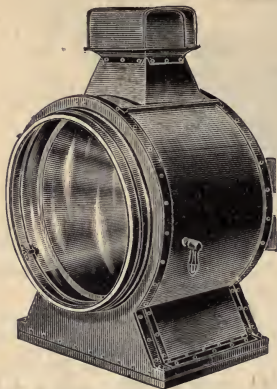


Fig. D. 1376. No. 1396.

*No. 1396. For oil.
 No. 1396-A. For electricity (arc).
 No. 1396-B. For gas (acetylene).



Fig. D. 1377. No. 1394.

*No. 1394. For oil.
 No. 1394-A. For electricity (arc).
 No. 1394-B. For gas (acetylene).

Size Headlight.	Steel Bottom.		Extreme Height.	Glass Circle.
	Depth.	Width.		
16 inches	13½ inches	20 inches	31½ inches	16 inches
18 "	14½ "	21½ "	34 "	19 "
20 "	16½ "	23½ "	37 "	20 "
23 "	19½ "	24½ "	39½ "	23 "

*Standard.

Prices and full information upon application.

Square Case.



Fig. D. 1378.

No.	Size Reflector, Inches.	Wooden Bottom, Inches.	Height, Inches.
1	14	12½x21	31
2	16	14 x24½	34½
3	18	15½x26½	36½
4	20	16½x29	39½
5	23	20½x31	43½

Prices upon application.

Head Light Burners.

With lighting attachment and adjustable improvements.....each, \$12 00
 Without lighting attachment and adjustable improvements.....each, \$10 00

Discount.....

LANTERNS.

No. 11.

Steel Guard.

Vertical guards are cut from heavy sheet steel, the horizontal guards passing through them. Erecting bail always ready for use. Ear bail and flat steel guards of one piece.

No strain on the top ring. Twisted ear gives strength and rigidity. Spring globe holders, self-adjusting to allow for expansion and contraction of glass.

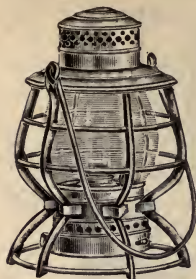


Fig. D. 1379.
Steel Guard.

With short shaft burner.



Fig. D. 1380.
Wire Guard.

With outside wick raiser.

Globe.	Lard Oil Ratchet Burner.	Price, per Dozen.	
		With S. S. Burner.	With Outside Wick Raiser.
White.....	Takes No. 1— $\frac{1}{4}$ -in. wick,	\$ 8 50	\$ 9 00
Ruby	or	13 00	13 50
Green or Blue.....	Takes No. 2—1-in. wick.	11 00	11 50

Discount.....

Wire Guard.

With patent ear bail, hinge top and spring globe holder.

The bail is fastened to the "ears" formed from the top ring, and of one piece of wire. There is no strain as when the bail is attached to dome of lantern.

Globe.	Lard Oil Ratchet Burner.	Price, per Dozen.	
		With S. S. Burner.	With Outside Wick Raiser.
White.....	Takes No. 1— $\frac{1}{4}$ -in. wick,	\$ 8 50	\$ 9 00
Ruby	or	13 00	13 50
Green or Blue.....	Takes No. 2—1-in. wick.	11 00	11 50

Discount.....

Wire Guard—Closed Bottom, No. 39.

With patent ear bail, hinge top and spring globe holder.

The bail is fastened to the "ears" formed from the top ring and of one piece of wire. There is no strain as when the bail is attached to dome of lantern.



Fig. D. 1381.

No. 39 with S. S. Burners.

Globe.	Price, per Dozen.	
	With S. S. Burner.	With Outside Wick Raiser.
White.....	\$ 8 00	\$ 8 50
Ruby	12 50	13 00
Green or Blue.....	10 50	11 00

Discount.....

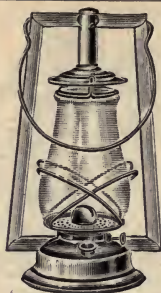


Fig. D. 1382.
No. O.

LANTERNS.

Tubular.

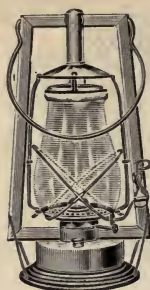


Fig. D. 1383.
Iron Clad.

Globe.	Price, per Dozen.	
	No. O.	Iron Clad.
White.....	\$ 9 00	\$10 00
Ruby.....	10 75	11 65
Blue.....	10 75	11 65
Green.....	10 75	11 65

Discount.....

CONDUCTORS' LANTERNS.

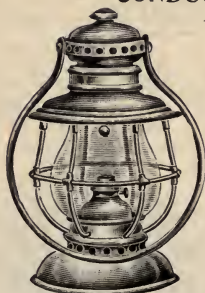


Fig. D. 1384.
"Queen."

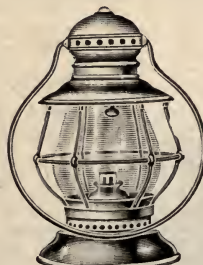


Fig. D. 1385.
"Pullman."

Finish.	Price, Each.	
	"Queen."	"Pullman."
Brass, plain.....	\$6 50	\$4 00
Brass, nickel-plated.....	8 50	5 50
Brass, silver-plated.....	10 50	7 50

Discount.....

LANTERN GLOBES.

Nos. 11 or 39.

Grade.	Price, per Dozen.		
	White.	Ruby.	Green or Blue.
Hand-made.....	\$3 50	.....	.....
Moulded.....	2 00	\$7 00	\$5 00
Lime.....	1 50	7 00	4 50

Discount.....

Tubular.

	Price, per Dozen.		
	White.	Ruby.	Green or Blue.
No. 0.....	\$0 90	\$3 50	\$3 50
No. 1.....	1 42	5 00	4 00

Discount.....

Conductors.

Style.	Price, per Dozen.		
	White.	Half Green.	Half Ruby.
Queen.....	\$6 00	\$21 00	\$27 00
Pullman.....	5 50	21 00	27 00

Discount.....

Candle Wick.

Best.....per lb., \$0 15
 No. 2....." 12

Discount.....

LAMP TRIMMERS.

Fig. D. 1386.

Price.....per doz., \$4 00

Discount.....

STATION SETTEES.



Fig. D. 1387.
Style No. 15.

Nailless construction. Plain oak frame, with continuous shaped seat and back of built-up birch veneer. With or without division arms. Regular lengths 6, 8, 10 or 12 feet.

Price.....per foot \$3 00

Discount.....

Can also furnish this style with double seats.

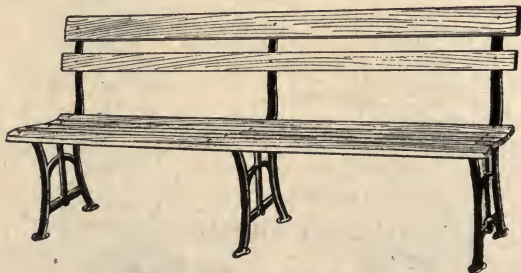


Fig. D. 1388.
Style No. 92.

A strong, durable, weather-proof settee. Back and seat are shaped with natural curves. Slats of selected ash; varnished for inside use, oil finish for outdoor use. Standards finished with black japan, baked on. Bolts countersunk and pocketed. Made regularly in lengths of 6, 8, 10 or 12 feet. No arms.

Price, for out-door use.....per foot \$0 75

Price, for inside use.....per foot 1 05

Discount.....

STATION SETTEES.



Fig. D. 1389.
Style No. 18.

Oak frame. Birch veneer. Continuous seat and back. Regular lengths 6, 8, 10 or 12 feet.

Price, per foot.....\$3 50

Discount.....

Can also furnish this style with double seats.

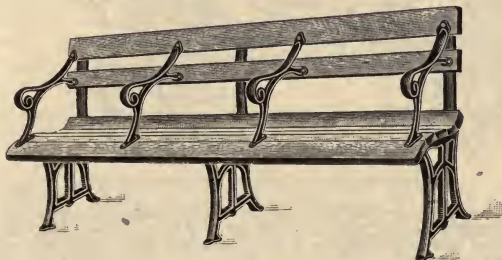


Fig. D. 1390
Style No. 9.

Built for either inside or outdoor use; not affected by the weather. Slats are carefully selected ash, castings japanned.

Made in maple, birch, plain oak, quarter-sawed oak or elm. Regular lengths 6, 8, 10 or 12 feet.

Price, per foot.....\$1 45

Discount.....

GASOLINE ENGINES.

Portable.

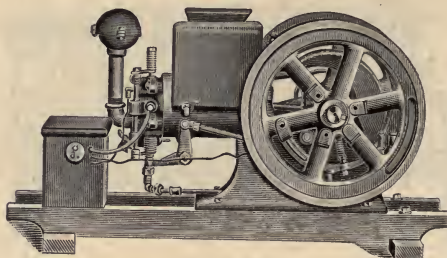


Fig. D. 1391.

3-H. P. Open Jacket on Skids.

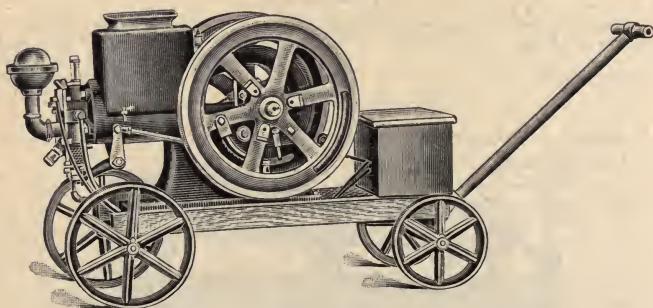


Fig. D. 1392.

3-H. P. Open Jacket on Hand Truck.

The 3-horse power open jacket engines are furnished on skids, semi-portable or hand portable trucks, and are equipped with plain pulley, gasoline tank and base, cylinder lubricator, muffler, battery complete (No. 7 dry cells), oil can and all necessary wrenches.

Jump spark ignition with suction-mixer of improved design.
Starting crank.

H. P.	Open Jacket Engine.	Floor Space, Inches.	Speed, R.P.M.	Drive Pulley.		Shipping Weight, Pounds.
				Diam, Inches.	Face, Inches.	
3	On skids	29x56	425	8	6	750
3	Semi-portable	30x56	425	8	6	800
3	Hand portable	30x58	425	8	6	875

Prices upon application.

GASOLINE ENGINES.

Stationary or Portable.

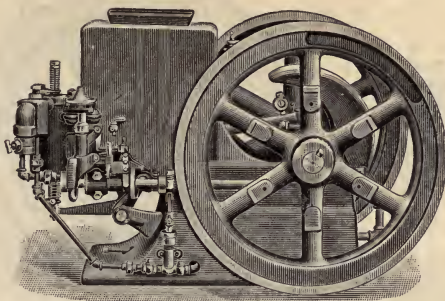


Fig. D. 1393.

Open Jacket.

The open jacket stationary engines are furnished with plain pulley, gasoline pump, gasoline tank in sub-base, cylinder lubricator, oil can and all necessary wrenches, foundation bolts, and blue prints for foundation. These engines are equipped with "jump spark ignition" which includes spark plug, jump spark coil, four dry cell batteries, switch and wire.

If engine is to be equipped to place gasoline tank outside of building, this must be stated in order.

No magneto is furnished with engine equipped with "jump spark ignition system." Extra charge will be made if ordered.

Actual Horse Power.	Floor Space, Inches.	Speed. R. P. M.	Drive Pulley.		Shipping Weight, Pounds.
			Diameter, Inches.	Face. Inches.	
*4	28x44	400	10	8	1000
6	34x50½	350	16	8	1600
8	38x62½	325	18	10	2200
14	45x79	280	20	12	3600

*The 4-horse power engine is similar in construction to the 6-horse power and larger, with the exception that it is equipped with the suction mixer and does not have the gasoline pump.

Can also furnish these engines on strong, durable steel trucks.
Prices upon application.

GASOLINE ENGINES.

Stationary or Portable.

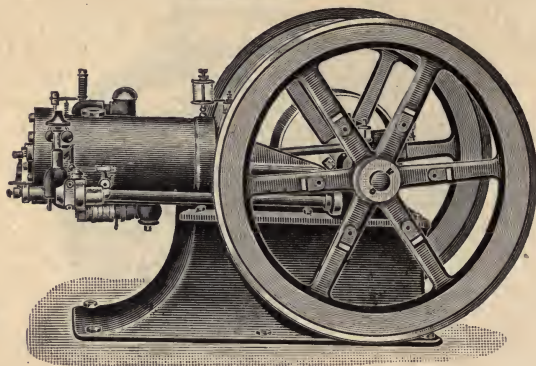


Fig. D. 1394. Horizontal.

All stationary engines are fitted with a simple and reliable gasoline pump, small reservoir and overflow; complying with the rules of the fire insurance regulations, relative to the installation of gasoline engines. Or if desired, will be equipped with attachments to run on gas, when so ordered, without any additional charges.

Regular equipment No. 1 for standard stationary engines; 6-horse power and larger, are furnished with plain pulley, large water cooling and gasoline tanks, with piping and fittings to connect same to engine, gasoline pump, muffler and one 10-foot length of exhaust pipe with fittings to connect muffler to engine, battery complete and magneto, cylinder lubricator and oil cups, oil can and all necessary wrenches, foundation bolts and blue prints for foundation.

These engines are regularly equipped with "make and break ignition" but can be equipped with "jump spark ignition" if customer desires, and when so equipped, no magneto is furnished with engine, and if ordered will be charged extra.

Actual Horse Power.	Floor Space, Inches.	Speed, R. P. M.	Drive Pulley.		Approximate Shipping Weight, Pounds.
			Diameter, Inches.	Face, Inches.	
6	28x56	350	16	8	1600
8	30x66	325	18	10	2200
12	32x72	280	20	12	2800
15	34x74	280	24	16	3500
20	40x82	260	24	16	5000
25	45x88	230	36	12	6500
30	48x96	225	36	12	7500

We can also furnish these engines mounted on substantial heavy steel trucks, equipped with neck yoke and whiffletree.

Prices upon application.

GAS ENGINES.

"Nash."

Have been on the market for the past twenty-seven years. They represent the latest and best ideas in gas engine design and are especially adapted for *bridge turning*, electric lighting, pumping—in fact all service where reliability, durability, economy and close regulation are required.

Can be furnished in the following sizes to operate on city gas, natural gas, gasoline and distillate—either belted or direct connection.

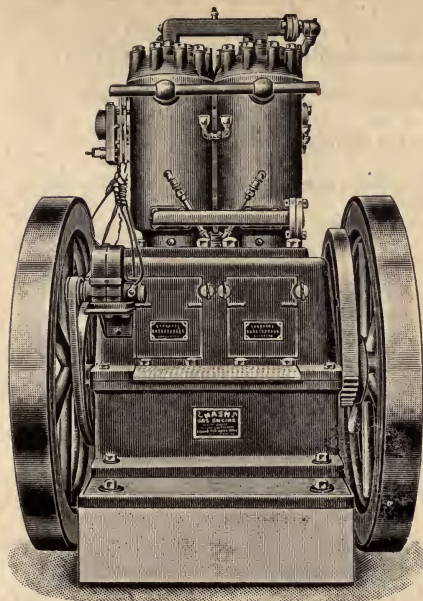


Fig. D. 1395.
Stationary.

Engine.		Speed.	Diameter of Flywheel.	Shipping Weight.
Size.	Horse Power.			
52	6	350	39x4 $\frac{1}{2}$ in.	2,500 lbs.
54	9	300	48x4 $\frac{1}{2}$ in.	3,300 lbs.
55	12	300	48x4 $\frac{1}{2}$ in.	3,500 lbs.
61	20	300	48x4 $\frac{1}{2}$ in.	5,000 lbs.
62	25	300	60x5 in.	5,500 lbs.
63	30	275	60x6 in.	9,000 lbs.
64	40	275	60x6 in.	10,050 lbs.
73	50	275	60x6 in.	14,100 lbs.
74	65	275	60x6 in.	15,000 lbs.
76	85	250	60x8 in.	24,000 lbs.
77	100	250	66x8 $\frac{1}{2}$ in.	31,000 lbs.
78	125	250	72x8 $\frac{1}{2}$ in.	35,000 lbs.
79	150	250	72x8 $\frac{1}{2}$ in.	36,000 lbs.
80	185	250	72x8 $\frac{1}{2}$ in.	38,000 lbs.
91	250	250	72x8 $\frac{1}{2}$ in.	50,000 lbs.

Can furnish other sizes upon request.
Also furnished to operate on producer gas.

Prices upon application.

WM. JESSOP & SON'S ENGLISH CAST STEEL.

Base Price, Sheet or Tool Steel.... Cents Net, Per Pound.

List of Ordinary Sizes.

Square }
 Round } } to 2 inches, inclusive.
 Octagon }

Flat.

$\frac{1}{8}$ in. thick by	$\frac{1}{4}$ in. and over in width.	$\frac{5}{16}$ in. thick by	$\frac{3}{4}$ to 6 in. wide, incl.
$\frac{1}{8}$ " " "	" " " " "	$\frac{3}{8}$ " " "	$\frac{1}{2}$ " " " "
$\frac{1}{4}$ " " "	" " " " "	$\frac{1}{2}$ " " "	$\frac{3}{4}$ " " " "
$\frac{3}{8}$ " " "	" " " " "	$\frac{3}{4}$ " " "	1 " " " "
$\frac{1}{2}$ " " "	" " " " "	$1\frac{1}{8}$ " " "	$1\frac{1}{4}$ " " " "
$\frac{3}{4}$ " " "	" " " " "	$1\frac{1}{4}$ " " "	$1\frac{3}{4}$ " " " "
1 " " "	" " " " "	$1\frac{3}{8}$ " " "	2 " " " "
	to 8 in. wide, incl.	$1\frac{1}{2}$ " " "	$2\frac{1}{4}$ " " " "
		$1\frac{3}{4}$ " " "	

Sheets—to No. 21 gauge, inclusive. Circular plates—10 to 46 inches, inclusive.

Annealing, 1 cent extra per pound.

List of Extra Sizes.

Square.		Octagon.		Round.	
Size, Inches.	Extra per Lb.	Size, Inches.	Extra per Lb.	Size, Inches.	Extra per Lb.
$\frac{1}{8}$	\$0 19	$\frac{1}{8}$	\$0 11	$\frac{1}{8}$	\$0 19
$\frac{1}{4}$ & 9 G.	15	$\frac{1}{4}$	06	$\frac{1}{4}$	11
$\frac{3}{8}$	11	$\frac{3}{8}$	03	$\frac{3}{8}$	06
$\frac{1}{2}$	09	$\frac{1}{2}$	02	$\frac{1}{2}$	03
$\frac{3}{4}$	06	$\frac{3}{4}$	01	$\frac{3}{4}$	02
1	03	1	01	1	02
$1\frac{1}{4}$	02	$1\frac{1}{4}$	02	$1\frac{1}{4}$	01
$1\frac{1}{2}$	01	$1\frac{1}{2}$	03	$1\frac{1}{2}$	01
$1\frac{3}{4}$	01	$1\frac{3}{4}$	04	$1\frac{3}{4}$	01
2	01	2	05	2	02
$2\frac{1}{4}$	02	$2\frac{1}{4}$	06	$2\frac{1}{4}$	03
$2\frac{1}{2}$	03	$2\frac{1}{2}$	07	$2\frac{1}{2}$	04
$2\frac{3}{4}$	04	$2\frac{3}{4}$	08	$2\frac{3}{4}$	05
3	05	3	09	3	06
$3\frac{1}{4}$	06	$3\frac{1}{4}$	09	$3\frac{1}{4}$	07
$3\frac{1}{2}$	07	$3\frac{1}{2}$	10	$3\frac{1}{2}$	08
$3\frac{3}{4}$	08			$3\frac{3}{4}$	09
4	09			4	10
$4\frac{1}{4}$	10			$4\frac{1}{4}$	10
$4\frac{1}{2}$	10			$4\frac{1}{2}$	11
$4\frac{3}{4}$	11				
5	11				
$5\frac{1}{4}$	11				
$5\frac{1}{2}$	12				
$5\frac{3}{4}$					
6					
$6\frac{1}{4}$					
$6\frac{1}{2}$					
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7					
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8					
$8\frac{1}{4}$					
$8\frac{1}{2}$					
$8\frac{3}{4}$					
9					
$9\frac{1}{4}$					
$9\frac{1}{2}$					
$9\frac{3}{4}$					
10					

Annealing, 1 cent extra per pound.

WM. JESSOP & SON'S ENGLISH CAST STEEL.

List of Extra Sizes—Flat.

Size, Inches.	Extra, per Lb.	Size, Inches.	Extra, per Lb.	Size, Inches.	Extra, per Lb.	Size, Inches.	Extra, per Lb.
$\frac{1}{8}$ x $\frac{1}{8}$	cts. 15	$\frac{1}{8}$ x $\frac{1}{8}$	cts. 2	$3\frac{1}{2}$ x 3	cts. 2	6 x $4\frac{1}{2}$	cts. 5
$\frac{1}{8}$ x $\frac{3}{8}$	7	$\frac{1}{8}$ x $\frac{3}{8}$	1	4 x $1\frac{1}{2}$ to 2 $\frac{1}{2}$	1	6 x 5	5
$\frac{1}{8}$ x 1 $\frac{1}{2}$ G	14	$\frac{1}{8}$ x 9 G	2	4 x 2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	2	$6\frac{1}{2}$ x $\frac{3}{8}$ to 1 $\frac{1}{2}$	1
$\frac{1}{8}$ x 1 $\frac{3}{8}$ G	13	$\frac{1}{8}$ x 10 G	2	$4\frac{1}{2}$ to 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	1	$6\frac{1}{2}$ x 2	2
$\frac{1}{8}$ x 1 $\frac{1}{2}$ G	12	$\frac{1}{8}$ x $\frac{3}{8}$	2	$4\frac{1}{2}$ to 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$	1	$6\frac{1}{2}$ x $\frac{3}{8}$ to 1 $\frac{1}{2}$	1
$\frac{1}{8}$ x $\frac{1}{8}$	11	$\frac{1}{8}$ x 9 G	2	$4\frac{1}{2}$ x 1	1	$6\frac{1}{2}$ x 2 and 2 $\frac{1}{2}$	2
$\frac{1}{8}$ x $\frac{3}{8}$	4	$\frac{1}{8}$ x 10 G	2	$4\frac{1}{2}$ x 2	1	$6\frac{1}{2}$ x 3	3
$\frac{1}{8}$ x 1 $\frac{1}{2}$ G	11	$\frac{1}{8}$ x $\frac{3}{8}$	1	$4\frac{1}{2}$ x 3 $\frac{1}{2}$	3	$6\frac{1}{2}$ x 4	4
$\frac{1}{8}$ x $\frac{3}{8}$	5	$\frac{1}{8}$ x $\frac{3}{8}$	2	$4\frac{1}{2}$ x 1 to 2	1	7 x $\frac{3}{8}$ to 1 $\frac{1}{2}$	1
$\frac{1}{8}$ x $\frac{3}{8}$	5	$\frac{1}{8}$ x $\frac{3}{8}$	2	$4\frac{1}{2}$ x 2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	2	7 x 1 $\frac{1}{2}$ to 2	2
$\frac{1}{8}$ x $\frac{3}{8}$	4	$\frac{1}{8}$ x $\frac{3}{8}$	1	$4\frac{1}{2}$ x 4	3	7 x 2 $\frac{1}{2}$	3
$\frac{1}{8}$ x $\frac{3}{8}$	2	$\frac{1}{8}$ x $\frac{3}{8}$	1	$4\frac{1}{2}$ x 4 $\frac{1}{2}$	3	7 x 3 to 4	4
$\frac{1}{8}$ x $\frac{3}{8}$	1	$\frac{1}{8}$ x 8 G	1	$4\frac{1}{2}$ x 1 $\frac{1}{2}$	1	7 $\frac{1}{2}$ x 1	1
$\frac{1}{8}$ x $\frac{3}{8}$	5	$\frac{1}{8}$ x 9 G	2	5 x $\frac{1}{2}$ to 1 $\frac{1}{2}$	1	7 $\frac{1}{2}$ x 1 $\frac{1}{2}$	1
$\frac{1}{8}$ x $\frac{3}{8}$	4	$\frac{1}{8}$ x $\frac{3}{8}$	1	5 x 2 to 3	2	7 $\frac{1}{2}$ x 3	4
$\frac{1}{8}$ x $\frac{3}{8}$	3	$\frac{1}{8}$ x 16 G	4	5 x 3 $\frac{1}{2}$	3	8 x $\frac{1}{2}$ to 1 $\frac{1}{2}$	1
$\frac{1}{8}$ x $\frac{3}{8}$	2	1 x 13 G	2	5 x 4	3	8 x 1 $\frac{1}{2}$ to 2	2
$\frac{1}{8}$ x $\frac{3}{8}$	1	1 x $\frac{1}{8}$	2	5 $\frac{1}{2}$ x $\frac{1}{2}$ to 1 $\frac{1}{2}$	1	8 x 3	3
$\frac{1}{8}$ x $\frac{3}{8}$	1	2 $\frac{1}{2}$ x 2	1	5 $\frac{1}{2}$ x 2 to 2 $\frac{1}{2}$	2	8 x 4	6
$\frac{1}{8}$ x $\frac{3}{8}$	3	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$ to 3 $\frac{1}{2}$	1	5 $\frac{1}{2}$ x 3	2	8 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2
$\frac{1}{8}$ x 1 $\frac{1}{2}$ GA	3 $\frac{1}{2}$	2 $\frac{1}{2}$ x 1 $\frac{1}{2}$ to 3	1	5 $\frac{1}{2}$ x 3 $\frac{1}{2}$	3	9 x 1	1
$\frac{1}{8}$ x $\frac{3}{8}$	2	3 x $\frac{3}{8}$	1	5 $\frac{1}{2}$ x 4	3	10 x 2 $\frac{1}{2}$	3
$\frac{1}{8}$ x $\frac{3}{8}$	2	3 x 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$	1	5 $\frac{1}{2}$ x 5	4	12 x 2 $\frac{1}{2}$	4
$\frac{1}{8}$ x $\frac{3}{8}$	1	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ and 2	1	6 x $\frac{1}{2}$ to 1 $\frac{1}{2}$	1	13 x 2 $\frac{1}{2}$	6
$\frac{1}{8}$ x $\frac{3}{8}$	1	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ to 2	1	6 x 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$	2	15 x 3	8
$\frac{1}{8}$ x $\frac{3}{8}$	1	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$	1	6 x 3 to 4	3		
$\frac{1}{8}$ x 1 $\frac{1}{2}$ G	4						

Annealing, 1 cent extra per pound.

List of Extra Sizes—Sheet Steel.

Size, Inches.	Extra per Lb.	Size, Inches.	Extra per Lb.
22 G	\$0 01	27 G	\$0 50
23	02	28	50
24	03	29	50
25	04	30	52
26	05		

All annealed sheets 2 cents extra per pound.

List of Extra Sizes—Circular Saw Plates.

Size, Inches.	Extra per Lb.	Size, Inches.	Extra per Lb.
Over 6 and under 8	\$0 04	74	\$0 14
Over 8 and under 10	02	76	16
48	01	78	19
50	02	80	20
52 and 54	03	82	22
56 to 60	05	84	24
62 and 64	07	86	26
66 to 70	09	88	28
72	11		

JESSOP'S "ARK" HIGH SPEED STEEL.

Directions for Working.

To cut.—Heat to dull red (1300° F.) and cut with shears or a chisel, or grind a deep V cold on all sides and break. This latter method, however, is not recommended, as cracks may possibly be started.

To forge.—Heat slowly in a clean charcoal or coke fire to a very light red color (1800° F.) and maintain this heat. The tool should be reheated while being forged when heat falls somewhat below 1800° F., and should preferably become thoroughly cold before reheating for hardening.

To harden.—For lathe, planer and boring tools, the nose or cutting parts should be brought slowly to a light orange color (2100° F.), or until they appear glazed or oily. They must not be allowed to fuse. Cool in a strong, dry blast. When not equipped with compressed air, dip only the nose of the tool in any clean, thin oil, until the nose is black, and then finish the cooling in an ordinary air blast, which must be free from moisture. If neither oil nor air blast are available, the tool should be cooled in the open air.

For twist drills, milling cutters, reamers, etc., heat to a salmon color (1900° F.) and plunge in any clean, thin oil; then draw the temper in oil heated to 900° F.

Dies require special treatment, which will be described on application to us for directions.

Base price,cents, net, per pound.

LIST OF EXTRA SIZES.

Flats.

All widths under one inch, with thickness to $\frac{1}{8}$ inch, inclusive	15c
All widths one inch and over, with thickness to $\frac{1}{8}$ inch, inclusive	15c
All widths five inches and over	5c

Rounds or Squares.

$\frac{1}{8}$ inch.....	60c	$3\frac{1}{2}$ to 4 inches.....	6c
$\frac{1}{4}$ inch.....	55c	$4\frac{1}{2}$ to $4\frac{1}{2}$ inches.....	8c
$\frac{3}{8}$ inch.....	20c	$4\frac{1}{2}$ to 5 inches.....	10c
$\frac{1}{2}$ to $\frac{5}{8}$ inch.....	15c	$5\frac{1}{2}$ to $5\frac{1}{2}$ inches.....	12c
$\frac{1}{2}$ to $\frac{1}{2}$ inch.....	10c	$5\frac{1}{2}$ to 6 inches.....	14c
$\frac{1}{2}$ inch.....	5c	$6\frac{1}{2}$ to $6\frac{1}{2}$ inches.....	16c
$2\frac{1}{2}$ to 3 inches.....	2c	Larger than $6\frac{1}{2}$ inches.....	20c
$3\frac{1}{2}$ to $3\frac{1}{2}$ inches.....	4c		

Flats larger than $2\frac{1}{2} \times 2$ inches, double the prices shown on page 715.

Dead soft annealed, five cents per pound more than unannealed.

Regular annealed, two cents per pound extra.

JESSOP'S SELF-HARDENING STEEL.

Base price, . . . cents, net, per pound.

Price List of Extra Sizes.**Flats:**

All widths under 1 inch, with thicknesses to $\frac{5}{16}$ inch, inclusive.....	15c
All widths 1 inch and over, with thicknesses to $\frac{3}{8}$ inch, inclusive.....	15c
All widths 5 inches and over.....	5c

Squares:

All sizes to $\frac{5}{16}$ inch, inclusive.....	15c
--	-----

Rounds:

All sizes to $\frac{5}{16}$ inch, inclusive.....	15c
--	-----

JESSOP'S "ARK" HIGH SPEED TREATED TOOL HOLDER BITS

The following sizes and lengths are carried in stock:

	Net Price, Each.
$\frac{1}{4}$ inch square, 2 inches long.....	7c
$\frac{5}{16}$ inch square, 2 inches long.....	9c
$\frac{3}{8}$ inch square, 2 $\frac{1}{2}$ inches long.....	15c
$\frac{1}{2}$ inch square, 3 inches long.....	21c
$\frac{3}{4}$ inch square, 3 inches long.....	33c
$\frac{1}{2}$ inch square, 3 $\frac{1}{2}$ inches long.....	45c

Special lengths made to order.

For price on "B-4 Any" High Speed Treated Tool Holder Bit, add $\frac{1}{2}$ c each to above list on "Ark".

Wm. Jessop & Sons, Inc., also make the following, which we are in position to furnish on short notice:

Track Tool Steel.	Magnet Steel.
Truss Spring Steel.	Nickel Steel.
Composite Die Stock.	Vanadium Steel.
Pen Steel.	Band Saw Steel.
Double Shear Steel.	Jessop's (L) Blister Steel.
Drill Steel.	Special Steel for turning Chilled Rolls.
Steel Castings.	Double Refined Steel.
Jessop's "494" Special.	Etc., etc.

Information and prices upon application.

MUSHET'S SPECIAL STEEL.

Base price..... cents net, per lb.

LIST OF EXTRA SIZES.

Advances on Price Ordinary Sizes.

Flats.

All widths under 1 inch with thicknesses to $\frac{1}{16}$ -inch, inclusive..... per lb., 15 cts.
 All widths 1 inch and over with thicknesses to $\frac{1}{16}$ -inch, inclusive..... " 15 "

Squares.

All sizes to $\frac{1}{16}$ -inch inclusive..... per lb., 15 cts.

Rounds.

All sizes to $\frac{1}{16}$ -inch inclusive..... per lb., 15 cts.
 Other sizes advance on other shapes..... " 5 "

Annealing.

Any size, add..... per lb., 2 cts.

MUSHET'S HIGH SPEED STEEL.

Base price..... cents net, per lb.

List of extras, same as for Mushet's Special Steel.

MUSHET HIGH SPEED STEEL HARDENED TOOL HOLDER LENGTHS.



Fig. D. No. 1396.

The steel is cut to standard lengths at an angle to save grinding in shaping the tool.

Each piece is carefully hardened and will give most excellent results without further heat treatment.

Packed one size in a box containing ten pounds each.

We offer the following sizes:

Size Squares, Inches.	Length, Inches.	Double Beveled for Cutting off Tools, Inches.	Size Squares, Inches.	Length, Inches.	Double Beveled for Cutting off Tools, Inches.
$\frac{3}{16}$	1½	$\frac{5}{8} \times \frac{1}{8} \times \frac{3}{4}$	$\frac{1}{2}$	4	1 x $\frac{3}{16} \times \frac{1}{8}$
$\frac{1}{4}$	2	$\frac{3}{4} \times \frac{1}{8} \times \frac{1}{2}$	$\frac{5}{8}$	4½	1 x $\frac{1}{4} \times \frac{3}{16}$
$\frac{5}{16}$	2½	$\frac{7}{8} \times \frac{1}{8} \times \frac{1}{2}$	$\frac{3}{4}$	5	1½ x $\frac{1}{16} \times \frac{1}{8}$
$\frac{3}{8}$	3	$\frac{7}{8} \times \frac{1}{8} \times \frac{1}{8}$	$\frac{7}{8}$	6	1½ x $\frac{1}{4} \times \frac{3}{16}$
$\frac{7}{16}$	3½	1 x $\frac{1}{8} \times \frac{3}{4}$	1	7	1½ x $\frac{1}{16} \times \frac{1}{4}$

Price cents net, per lb.

MUSHET'S EXTRA BEST TITANIC STEEL.

Price cents net, per lb.

Annealing..... 2 cts. per lb. extra.

CAST SPRING STEEL.

American.....cents, per lb.

TAYLOR BEST YORKSHIRE IRON.

For stay bolts, piston rods, axles, crank pins, side rods, etc.

This iron is unequalled for strength, soundness and uniformity, and is capable of receiving the highest finish.

The following sizes of Taylor Iron are kept in stock for immediate deliveries:

Round, Inches.				Square, Inches.		Hexagon, Inches.	
$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{5}{8}$	$1\frac{7}{8}$
$\frac{7}{16}$	$\frac{3}{4}$	$1\frac{3}{4}$	$2\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$
$\frac{1}{2}$	1	$1\frac{1}{2}$	3	$\frac{5}{8}$	2	$1\frac{1}{8}$	$1\frac{1}{2}$
$\frac{9}{16}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$3\frac{1}{4}$	$\frac{3}{4}$	$2\frac{1}{4}$	$\frac{7}{8}$	$1\frac{1}{2}$
$\frac{5}{8}$	$1\frac{1}{4}$	2	$3\frac{1}{4}$	$\frac{7}{8}$	3	1	$1\frac{1}{2}$
$1\frac{1}{8}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{1}{2}$	1	4	$1\frac{1}{8}$	2
$\frac{3}{4}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{1}{8}$		$1\frac{1}{2}$	$2\frac{1}{2}$
$1\frac{1}{8}$	$1\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{3}{4}$	$1\frac{1}{4}$		$1\frac{3}{8}$	
$\frac{7}{8}$	$1\frac{5}{8}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{3}{8}$		$1\frac{1}{4}$	
$1\frac{1}{4}$	$1\frac{3}{4}$	$2\frac{3}{4}$	4	$1\frac{1}{2}$		$1\frac{3}{4}$	

Sizes not in stock can be furnished in three weeks from receipt of order.

Price.....cents, per lb.

Prices upon application,

STANDARD PRICE LIST OF PATENT COLD-ROLLED STEEL SHAFTING PISTON RODS, ETC.

Made to Whitworth Standard Gauge and Accurately Straightened.

Diameter.		Weight per Foot.	Price per Pound.	Diameter.		Weight per Foot	Price per Pound.
Inches.	M. M.			Inches.	M. M.		
6	152.40	96.14	8c.	1½	38.10	6.01	5c.
5½	150.81	94.14	7½c.	1½	37.31	5.60	
5½	139.70	80.77		1½	36.51	5.52	
5½	138.11	78.95	7c.	1½	35.72	5.26	
5	127.00	67.45		1½	34.93	5.05	5c.
4½	125.41	65.50	6½c.	1½	33.34	4.61	
4½	120.65	60.88		1½	32.54	4.40	
4½	114.30	54.11	6c.	1½	31.75	4.17	
4½	112.71	52.62		1½	30.96	4.02	5½c.
4½	107.95	48.26		1½	30.48	3.86	
4½	106.36	46.65		1½	30.16	3.77	
4	101.60	42.75	5½c.	1½	29.37	3.58	
3½	100.01	41.04		1½	28.58	3.38	5c.
3½	98.43	39.40		1½	27.78	3.20	
3½	95.25	37.57		1½	27.38	3.11	
3½	93.66	36.40	5½c.	1½	26.99	3.02	5c.
3½	92.08	35.20		1½	26.19	2.85	
3½	90.49	34.00		1	25.40	2.68	
3½	88.90	32.73		1	24.61	2.52	
3½	87.31	31.58	5½c.	1	23.81	2.35	6c.
3½	85.73	30.43		1	23.42	2.27	
3½	82.55	28.22		1	23.02	2.20	
3½	80.96	27.16		1	22.23	2.05	
3½	79.38	26.09	5c.	1	21.43	1.94	6c.
3	76.20	24.05		1	21.03	1.90	
2½	74.61	23.06		1	20.64	1.77	
2½	73.03	22.09		1	20.24	1.68	7c.
2½	71.44	21.15	5c.	1	19.84	1.59	
2½	69.85	20.21		1	19.05	1.50	
2½	68.26	19.31		1	18.65	1.43	
2½	66.68	18.41	5c.	1	18.26	1.38	6c.
2½	65.09	17.55		1	17.46	1.26	
2½	63.50	16.70		1	17.07	1.22	
2½	61.91	15.89		1	16.67	1.17	
2½	60.33	15.07	5c.	1	16.27	1.11	7c.
2½	58.74	14.35		1	15.88	1.05	
2½	57.15	13.52		1	15.08	1.00	
2½	55.56	12.80		1	14.29	.845	
2½	53.98	12.07	5c.	1	13.49	.757	8½c.
2½	52.39	11.35		1	12.70	.667	
2	50.80	10.69		1	11.90	.586	
1½	49.21	10.03		1	11.11	.511	
1½	47.63	9.39	5c.	1	10.32	.450	10c.
1½	46.83	9.10		1	9.53	.375	
1½	46.04	8.78		1	8.73	.320	
1½	44.45	8.18		1	7.94	.260	
1½	42.86	7.61	5c.	1	6.35	.167	10c.
1½	41.28	7.06		1	5.56	.130	
1½	39.69	6.52		1	4.76	.095	
1½				1			

Discount.

NOTE.—The above prices are for shafts from 1 foot to 24 feet long, inclusive.
One-half cent per pound net extra for pump and piston rods.

BAR IRON.**Standard Classification.****Extras, Per 100 Pounds.****Flats.**

$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	\$1 50	$4\frac{1}{2}$ to 6 x $\frac{1}{4}$ to $\frac{5}{16}$	\$0 30
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	1 00	$4\frac{1}{2}$ to 6 x $\frac{1}{4}$ to 1.....	10
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	90	$4\frac{1}{2}$ to 6 x $1\frac{1}{8}$ to $1\frac{1}{2}$	40
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	80	$4\frac{1}{2}$ to 6 x $1\frac{1}{8}$ to 2.....	60
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	50	$4\frac{1}{2}$ to 6 x 2 to 3.....	80
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	50	$6\frac{1}{2}$ to $6\frac{3}{4}$ x $\frac{1}{4}$ to $\frac{5}{16}$	50
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{1}{4}$ to $\frac{5}{16}$	40	7 to 8 x $\frac{1}{4}$ to $\frac{5}{16}$	70
$\frac{1}{16}$ to $1\frac{1}{8}$ x $\frac{1}{4}$ to $\frac{5}{16}$	30	$6\frac{1}{2}$ to 8 x $\frac{1}{4}$ to $1\frac{1}{2}$	60
$\frac{1}{16}$ to $1\frac{1}{8}$ x $\frac{1}{4}$ to $\frac{5}{16}$	20	$6\frac{1}{2}$ to 8 x 1 to 2.....	80
$1\frac{1}{2}$ to $1\frac{3}{4}$ x $\frac{1}{4}$ to 1.....	10	$6\frac{1}{2}$ to 8 x $2\frac{1}{2}$ to 3.....	1 00
$1\frac{1}{2}$ to 4 x $\frac{1}{4}$ to $\frac{5}{16}$	20	$8\frac{1}{2}$ to 10 x $1\frac{1}{4}$ to $\frac{5}{16}$	70
$1\frac{1}{2}$ to 4 x $\frac{1}{4}$ to 1 base no extra.		$8\frac{1}{2}$ to 10 x $\frac{1}{4}$ to 1.....	80
$1\frac{1}{2}$ to 4 x $1\frac{1}{8}$ to $1\frac{1}{2}$	30	$8\frac{1}{2}$ to 10 x $1\frac{1}{8}$ to $1\frac{1}{2}$	90
2 to 4 x 1 to 2.....	50	$8\frac{1}{2}$ to 10 x $1\frac{1}{8}$ to 2.....	1 00
2 to 4 x $2\frac{1}{8}$ to 3.....	60		

Rounds and Squares.

$\frac{1}{16}$	\$2 50	1 to $1\frac{1}{2}$	base no extra.
$\frac{1}{16}$ to $\frac{9}{16}$	1 40	2 to $2\frac{7}{8}$	\$0 20
$\frac{1}{4}$ to $\frac{9}{16}$	90	3 to $3\frac{1}{2}$	50
$\frac{1}{4}$ to $\frac{9}{16}$	70	3 to 4.....	80
$\frac{1}{4}$ to $\frac{9}{16}$	50	$4\frac{1}{2}$ to $4\frac{1}{2}$	1 00
$\frac{1}{4}$ to $\frac{9}{16}$	40	4 to 5.....	1 30
$\frac{1}{4}$ to $\frac{9}{16}$	30	5 to 6.....	1 80
$\frac{1}{4}$ to $\frac{9}{16}$	20	$6\frac{1}{2}$ to $6\frac{1}{2}$	2 20
$\frac{1}{4}$ to $\frac{9}{16}$	10	$6\frac{1}{2}$ to $7\frac{1}{4}$	2 50

Ovals.

$\frac{1}{16}$ to $\frac{7}{16}$	\$1 10	$\frac{1}{16}$ to $\frac{11}{16}$ x $\frac{1}{4}$	\$1 20
$\frac{1}{16}$ to $\frac{7}{16}$	80	$\frac{1}{16}$ to $\frac{11}{16}$	50
$\frac{1}{16}$ to $\frac{7}{16}$ x $\frac{3}{16}$	1 00	$\frac{1}{16}$ to $1\frac{1}{2}$	40
$\frac{1}{16}$ to $\frac{7}{16}$	60		

Half Ovals and Half Rounds.

$\frac{1}{16}$	\$4 50	$\frac{1}{16}$ to $\frac{11}{16}$	\$0 90
$\frac{1}{16}$ to $\frac{7}{16}$	3 50	$\frac{1}{16}$ to $\frac{11}{16}$	70
$\frac{1}{16}$ to $\frac{7}{16}$	2 50	$\frac{1}{16}$ to 2.....	50
$\frac{1}{16}$ to $\frac{7}{16}$	1 20	$2\frac{1}{4}$ to 3.....	60

Half ovals less than quarter their width in thickness, extra price.

Additional Extras.

All sizes not enumerated, subject to special agreement.

All round edge iron, 20 cents per 100 pounds extra.

Bevel edge shaft iron, 10 cents per 100 pounds higher than same size of flats.

Half round $\frac{1}{4}$ to $1\frac{1}{2}$ -inch iron, 50 cents per 100 pounds extra.

Horseshoe iron, all sizes, \$1 00 per 100 pounds extra.

Cutting to Length.

From two cents to four cents per 100 pounds, according to length and size as may be agreed upon.

Horseshoe Iron.

Horseshoe iron, all sizes, \$1 00 per 100 pounds extra

BAND IRON.

Standard Classification.

Extras Per 100 Lbs.

Heavy Band Iron.

8½	to 10	x ½	to ⅞	.....	\$0 70
7	to 8	x ½	to ⅞	.....	70
6½	to 6½	x ½	to ⅞	.....	50
4½	to 6	x ½	to ⅞	.....	30
1½	to 4	x ½	to ⅞	.....	20
1	to 1½	x ½	to ⅞	.....	30
¾	to 1½	x ½	to ⅞	.....	50
¾	to 1½	x ½	to ⅞	.....	80
¾	to 1½	x ½	to ⅞	.....	1 00
¾	to 1½	x ½	to ⅞	.....	1 50

Heavy bands ⅞ inches thick, 10 cents per 100 pounds higher than ½ to ¾ inches thick.

Bevel edge shaft iron 10 cents higher than same size of heavy bands.

Light Bands.

7	to 8	x Nos. 9 to ⅞	.....	\$0 90
7	to 8	x Nos. 10, 11, 12	.....	1 00
6½	to 6½	x Nos. 9 to ⅞	.....	70
6½	to 6½	x Nos. 10, 11, 12	.....	80
4½	to 6	x Nos. 9 to ⅞	.....	50
4½	to 6	x Nos. 10, 11, 12	.....	60
1½	to 4	x Nos. 9 to ⅞	.....	40
1½	to 4	x Nos. 10, 11, 12	.....	50
1	to 1½	x Nos. 9 to ⅞	.....	50
1	to 1½	x Nos. 10, 11, 12	.....	60
⅞	to ⅞	x Nos. 9 to ⅞	.....	60
⅞	to ⅞	x Nos. 10, 11, 12	.....	70
⅞	to ⅞	x Nos. 9 to ⅞	.....	80
⅞	to ⅞	x Nos. 10, 11, 12	.....	90
⅞	to ⅞	x Nos. 9 to ⅞	.....	1 00
⅞	to ⅞	x Nos. 10, 11, 12	.....	1 10
⅞	to ⅞	x Nos. 9 to ⅞	.....	1 30
⅞	to ⅞	x Nos. 10, 11, 12	.....	1 40
¾	x Nos. 9 to ⅞	.....	.....	1 50
¾	x Nos. 10, 11, 12	.....	.....	1 60

Bevel edge box iron same as light bands of same size.

Beaded band iron 1½ to 2 inches, 70 cents per 100 pounds, extra.

Sand band iron 10 cents per 100 pounds above same size of light band.

Cutting to length, 10 cents to 30 cents extra, according to length and size.

NORWAY IRON.

Extras Per 100 Lbs.

Flats.

1½	to	4 x ½	to	1 inch...	Base.	
4½	to	6 x ½	to	1 " ...	extra, \$0	10
1½	to	6 x 1½	to	1½ " ...	"	20
2½	to	6 x 2		"	"	50
1½	and	1½ x 3	to	1 " ...	"	10
1	and	1½ x ½	to	½ " ...	"	20
½, ¾, 1 and 1½	x ½	to	½ " ...	"	"	40
1½	to	6 x ½	and	½ " ...	"	20
1	to	1½ x ½	x ½	"	"	30
¾	and	1½ x ½	x ½	"	"	50
¾	and	1½ x ½	and	½ " ...	1 00	
1	to	2 x ½		"	"	50
¾	and	1½ x ½		"	"	80
¾	and	1½ x ½		"	"	1 20

Rounds and Squares.

1	to	1½ inch.....	Base.	
2	to	2 "	extra, \$0	10
2½	to	3 "	"	20
3½	to	4 "	"	50
¾	to	1 "	"	10
¾	to	1 "	"	20

Rounds and Squares.

¾	to	½ inch.....	extra, \$0	30
¾	inch.....	"	"	40
¾	"	"	"	60
¾	"	"	1 00	
¾	"	"	1 50	

Oval.

¾	to	1½ inch.....	extra, \$0	40
¾	to	1½ "	"	50
¾	to	1½ "	"	60
¾	to	1½ "	"	80
¾	to	1½ "	1 10	
¾	to	1½ x ½ "	1 00	
¾	to	1½ x ½ "	1 20	

Half Oval and Half Round.

¾	to	2 inch.....	extra, \$0	50
¾	to	1½ "	"	70
¾	to	1½ "	"	90
¾	to	1½ "	1 20	
¾	to	1½ "	2 50	
¾	to	1½ "	3 50	
¾	to	1½ "	4 50	

STEEL.

Extras Per 100 Lbs.

Angles.

1½ x ½ inches and heavier, but under 3 inches.....	Base.	
1 to 1½ x ½ inches and heavier.....	\$0 10 per 100 lbs. extra	
1½ x ½ inches.....	20	" "
1½ x ½ inches.....	30	" "
1½ x ½ inches.....	2 00	" "
1½ x ½ inches.....	3 00	" "
3x3 inches x less than ½ inch thick.....	50	" "
Angles ½ inch and larger, but smaller than 3 inches, ½ inch thick.....	10	" over ½ in.
For intermediate sizes, the next higher extra to be charged in all cases.		

Channels.

1½ x ½ inches and heavier, but under 3 inches.....	Base	
1 to 1½ x ½ inches and heavier.....	\$ 10 extra	
1½ x ½ inches.....	20	"
1½ and 1½ x ½ inches.....	30	"
1½ x ½ inch.....	2 00	"
1½ x ½ inch and thicker.....	3 00	"
Channels ½ inch and wider, but under 3 inches, ½ inch thick.....	10 over ½	

MILD OR SOFT STEEL.

Standard Classification.

Adopted October 1, 1909.

Open Hearth and Bessemer.

Squares up to 4 inches only.

Intermediate sizes take the next higher extra.

Extras Per 100 Lbs.

Rounds and Squares.

$\frac{1}{8}$ to $3\frac{1}{8}$ inches	Base.
$\frac{1}{8}$ to $\frac{1}{4}$ "	\$0 10 extra
$\frac{1}{2}$ to $\frac{1}{4}$ "	20 "
$\frac{7}{16}$ "	40 "
$\frac{3}{8}$ "	50 "
$\frac{1}{2}$ "	60 "
$\frac{5}{8}$ "	70 "
$\frac{3}{4}$ "	80 "
$1\frac{1}{4}$ "	1 00 "
$1\frac{1}{2}$ "	1 50 "
$1\frac{3}{4}$ "	2 00 "
$2\frac{1}{4}$ "	2 50 "
$3\frac{1}{8}$ to $3\frac{3}{8}$ "	15 "
$3\frac{1}{2}$ to $4\frac{1}{8}$ "	25 "
$4\frac{1}{2}$ to $4\frac{3}{4}$ "	30 "

Flat Bars and Heavy Bands.

1 to 6 inches x $\frac{3}{8}$ to 1 inch	Base
1 to 6 " x $\frac{1}{4}$ to $\frac{5}{8}$ "	\$0 20 extra
$\frac{1}{8}$ to $\frac{1}{8}$ " x $\frac{3}{8}$ to $\frac{1}{2}$ "	40 "
$\frac{1}{4}$ to $\frac{1}{4}$ " x $\frac{1}{2}$ to $\frac{5}{8}$ "	50 "
$\frac{3}{8}$ to $\frac{3}{8}$ " x $\frac{3}{8}$ to $\frac{1}{2}$ "	50 "
$\frac{1}{2}$ to $\frac{1}{2}$ " x $\frac{1}{2}$ to $\frac{5}{8}$ "	70 "
$\frac{3}{4}$ " x $\frac{3}{8}$ to $\frac{7}{8}$ "	1 00 "
$\frac{1}{2}$ " x $\frac{1}{2}$ to $\frac{5}{8}$ "	1 20 "
$\frac{7}{8}$ " x $\frac{3}{8}$ "	1 40 "
$\frac{7}{8}$ " x $\frac{1}{2}$ to $\frac{5}{8}$ "	1 60 "
$\frac{3}{4}$ " x $\frac{1}{2}$ to $\frac{5}{8}$ "	2 00 "
$1\frac{1}{8}$ to 6 " x $1\frac{1}{8}$ to $1\frac{3}{8}$ "	10 "
$1\frac{1}{2}$ to 6 " x $1\frac{1}{2}$ to $1\frac{1}{2}$ "	20 "
$1\frac{3}{4}$ to 6 " x $1\frac{3}{4}$ to $2\frac{1}{4}$ "	30 "
$3\frac{1}{2}$ to 6 " x 3 to 4 "	40 "

MILD OR SOFT STEEL.**Standard Classification.**

Adopted October 1, 1909.

Open Hearth and Bessemer.

For intermediate sizes, the next higher extra to be charged in all cases.

Extra Per 100 Lbs.**Light Bars and Bands.**

1½ to 6 inches	x Nos. 7, 8, 9 and ⅜ inch.....	\$0 40 extra
1½ to 6 "	x Nos. 10, 11, 12 and ½ inch.....	60 "
1 to 1⅞ "	x Nos. 7, 8, 9 and ⅜ inch.....	50 "
1 to 1⅞ "	x Nos. 10, 11, 12 and ½ inch.....	70 "
1½ to 1½ "	x Nos. 7, 8, 9 and ⅜ inch.....	70 "
1½ to 1½ "	x Nos. 10, 11, 12 and ½ inch.....	80 "
1½ to ½ "	x Nos. 7, 8, 9 and ⅜ inch.....	1 00 "
1½ to ½ "	x Nos. 10, 11, 12 and ½ inch.....	1 20 "
⅞ to ⅞ "	x Nos. 7, 8, 9 and ⅜ inch.....	1 20 "
⅞ to ⅞ "	x Nos. 10, 11, 12 and ½ inch.....	1 30 "
½ "	x Nos. 7, 8, 9 and ⅜ inch.....	1 30 "
½ "	x Nos. 10, 11, 12 and ½ inch.....	1 50 "
⅞ "	x Nos. 7, 8, 9 and ⅜ inch.....	1 80 "
⅞ "	x Nos. 10, 11, 12 and ½ inch.....	2 10 "
¾ "	x Nos. 7, 8, 9 and ⅜ inch.....	1 90 "
¾ "	x Nos. 10, 11, 12 and ½ inch.....	2 40 "

Ovals.

¾ to 1½ inches.....	\$0 30 extra
¾ to 1½ "	50 "
⅞ "	60 "
½ "	80 "
⅞ "	1 00 "
"	1 20 "

Half Ovals and Half Rounds.

⅞ inch	x ⅞ inch and thicker.....	\$0 50 extra
⅞ "	x Nos. 7, 8, 9 and ⅜ inch.....	70 "
¾ "	x Nos. 10, 11, 12 and ½ inch.....	1 00 "
¾ " to 1½ inch	x ⅞ inch and thicker.....	80 "
¾ " to 1½ "	x Nos. 10, 11, 12 and ½ inch.....	1 20 "
⅞ " to 1½ "	x ⅞ inch (No. 9) and thicker.....	1 00 "
⅞ " to 1½ "	x Nos. 10, 11, 12 and ½ inch.....	1 30 "
½ " to ⅞ "	x ½ inch and thicker.....	1 30 "
½ " to ⅞ "	x Nos. 13, 14 and 15.....	1 80 "
⅞ "	x ⅞ inch and thicker.....	2 10 "

PLANISHED IRON.**For Locomotive Jackets.**

First quality A, 28 and 30 inches wide by 48, 56, 60, 72 and 84 inches long.....per lb.....

Prices quoted upon application.

GALVANIZED SHEETS.

Prices quoted upon application.

PLATE STEEL.**List of Extras Adopted by Plate Manufacturers.**

For rectangular plates $\frac{1}{4}$ -in on edges and thicker over 14 inches wide and up to 100 inches wide.....Base \$.....

Gauges lighter than $\frac{1}{4}$ -inch to and including $\frac{1}{8}$ -inch plates on thin edges.....\$0 10 per lb. extra.

Gauges No. 7 and No. 8.....15 " "

" " 9, 10 and 11.....25 " "

Plates over 100 inches to 110 inches.....05 " "

" " 110 " " 115 "10 " "

" " 115 " " 120 "15 " "

" " 120 " " 125 "25 " "

" " 125 " " 130 "50 " "

" " 130 " "1 00 " "

All sketches (excepting straight taper plates, varying not more than 4 inches in widths at ends, narrowest end being not less than 30 inches).....10 " "

Complete Circles.....20 " "

Boiler and Flange Steel Plates.....10 " "

Marine, "A. B. M. A." and ordinary Fire-box Steel Plates..20 " "

Still Bottom Steel.....30 " "

Locomotive Fire-box Steel.....50 " "

Less than carload lots.....05 " "

Shell grade of steel is abandoned.

Special price for rectangular tank, bridge and ship plates in widths $6\frac{1}{2}$ inches to 14 inches.

Conditions.

Base price for tank steel plates $\frac{1}{4}$ -inch thick and thicker, rectangular sizes up to and including 100 inches wide down to but not including 14 inches wide, by $\frac{1}{4}$ -inch thick and thicker, of tank, ship or bridge quality, thickness being determined by Birmingham gauge on the edge of the plates.

Steel plates up to 72 inches wide, inclusive, ordered 10.2 pounds per square foot shall be considered $\frac{1}{4}$ -inch plate. Steel plates over 72 inches wide must be ordered $\frac{1}{4}$ -inch thick on edge, or not less than 11 pounds per square foot to take base price. Steel plates over 72 inches wide ordered less than 11 pounds per square foot down to the weight of $\frac{1}{4}$ inch shall take the price of $\frac{1}{4}$ inch. Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' standard specifications.

STANDARD STEEL WIRE NAILS.

(In kegs.)

Revised February 1, 1910.

Extras, Per Keg of 100 Pounds.

**Common, Fence, Shingle, Tobacco,
Flooring and Common Brads.**

	Advances
20d to 60d.....	Base
10d to 16d.....	\$0 05
8d and 9d.....	10
6d and 7d.....	20
4d and 5d.....	30
3d.....	45
2d.....	70

**Barbed Common and Barbed
Car Nails.**

15 cents advance over common.

**Casing, Siding and Smooth
Box Nails.**

10d and larger.....	\$0 15
8d and 9d.....	25
6d and 7d.....	35
4d and 5d.....	50
3d.....	70
2d.....	1 00
Barbed box, 15 cents advance over smooth nails.	

Smooth Finishing Nails.

10d and larger.....	\$0 25
8d and 9d.....	35
6d and 7d.....	45
4d and 5d.....	65
3d.....	85
2d.....	1 15

Slating Nails.

2d.....	\$0 80
3d.....	60
4d.....	40
5d.....	40
6d.....	30

Fine Nails.

2d.....	\$1 00
2d, extra fine, 1x17.....	1 10
3d, 1½x15.....	50
3d, extra fine, 1½ x 16.....	65
4d.....	50

Barrel Nails.

	Advances
¾ inch.....	\$1 35
1 ".....	1 00
1 ½ ".....	85
1 ¾ ".....	70
2 ".....	60
2 ½ ".....	50
3 ".....	40
3 ½ ".....	30

Barbed Roofing Nails.

¾ inch.....	\$0 75
1 ".....	65
1 ½ ".....	60
1 ¾ ".....	60
2 " and 1 ½ inch.....	55
2 ½ " and 1 ¾ ".....	45
3 inch.....	35

Clinch Nails.

(Annealed or Bright.)

2d.....	\$1 05
3d.....	85
4d and 5d.....	65
6d and 7d.....	55
8d and 9d.....	45
10d to 20d.....	35

Hinge Nails.

(Annealed or Bright.)

4d.....	\$0 80
6d.....	70
8d.....	60
10d and larger.....	50

Boat Nails.

25 cents extra over hinge.

Spikes.

All sizes to 9 inches.....	\$0 10
10-inch and larger.....	25
Special gauges 10 cents additional	

Barbed Dowel Pins No. 8.

¾ inch.....	\$1 25
1 ".....	1 00
1 ½ ".....	85
2 ".....	70
2 ½ ".....	60
3 ".....	60
3 ½ ".....	60
4 ".....	60

Extras.

Annealed Nails (except Clinch and Hinge) 15 cents per 100 lbs. extra.

Blued Nails 25 cents per 100 lbs. extra.

For galvanizing all standard nails, \$1.10 per 100 lbs.

Special heads 15 cents per 100 lbs. extra.

Special points 15 cents per 100 lbs. extra.

Discount.....

Standard Steel Wire Nails—Continued next page.

STANDARD STEEL WIRE NAILS.—Continued.

Miscellaneous Wire Nail List.

February, 1910.

Applying to all Nails except Standard Nails in kegs or boxes.

Prices stated are for 1, 5 and 10 pound packages.

Price Per Pound.

Wire Gauge.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Inch.																								
$\frac{1}{8}$																		1 80	2 00	2 30	2 40	2 55	---	---
$\frac{1}{4}$																	1 00	1 25	1 55	1 90	2 15	2 35	2 55	3 10
$\frac{3}{8}$																	80	90	1 00	1 25	1 55	1 95	2 15	2 40
$\frac{1}{2}$																	75	85	1 00	1 25	1 65	1 90	---	---
$\frac{5}{8}$																	65	75	85	1 10	1 45	1 65	---	---
$\frac{3}{4}$																	60	70	85	---	---	---	---	---
$\frac{7}{8}$																	56	67	---	---	---	---	---	---
1																	53	64	---	---	---	---	---	---
$1\frac{1}{8}$																	53	---	---	---	---	---	---	---
$1\frac{1}{4}$ and $1\frac{1}{2}$																	---	---	---	---	---	---	---	---
$1\frac{1}{2}$ and $1\frac{3}{4}$																	---	---	---	---	---	---	---	---
$1\frac{3}{4}$																	---	---	---	---	---	---	---	---
2																	---	---	---	---	---	---	---	---
$2\frac{1}{4}$																	---	---	---	---	---	---	---	---
$2\frac{1}{2}$																	---	---	---	---	---	---	---	---
$2\frac{3}{4}$																	---	---	---	---	---	---	---	---
3 and $3\frac{1}{2}$																	---	---	---	---	---	---	---	---
$3\frac{1}{2}$ and 4																	---	---	---	---	---	---	---	---

Discount.....

Extras—Add to List.

$\frac{1}{8}$ lb. papers.....	4c
$\frac{1}{4}$ " ".....	8c
Oval, cone, or other special heads or special points, or for barbing or annealing.....	2c
Nails combining several specialties, add as above for each.	
Galvanized or Tin Nails at special prices.	

Deduct from List.

Nails in 25 or 50 lb. boxes, or 100 lb. kegs, bulk.....	1c.
Nails in 100 lb. kegs.....	2c.

NOTE.—For length and number to the pound, see page 746.

"PERFECT HANDLE" WRENCHES**Monkey.**

Fig. D. 1397.

The entire bar, from top of head to end of handle is drop forged. The swell of the handle is largest at the end, giving from one to three inches more leverage, depending on the size of the wrench.

Water-proof handles locked in under pressure. No splits, no cracks. The wooden handle is there to stay.

Length, inches.....	6	8	10	12	15	18	21
Jaw opening, inches...	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2 $\frac{1}{8}$	2 $\frac{1}{2}$	3 $\frac{1}{8}$	4
List price, per doz...	\$9 00	\$10 00	\$12 00	\$14 00	\$24 00	\$30 00	\$36 00

Discount.....

Off-Set.

The "Perfect Handle," solid head, off-set wrench is a distinct advance over the common, cold, harsh all-steel solid head wrench. The "Perfect Handle" gives a most excellent grip and the shape of the "Perfect Handle" with a swell at the end gives the benefit of the greatest leverage without danger of the hand slipping off.



Fig. D. 1398.

For nuts, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Opening, inches.....	$\frac{1}{2}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$
Length, inches.....	7 $\frac{1}{2}$	9 $\frac{1}{2}$	11 $\frac{1}{2}$
Thickness, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$
Degrees.....	15	15	15
List price, per dozen.....	\$5 00	\$6 50	\$8 50

Discount.....

Adjustable Straight Handle.

Fig. D. 1399.

This is a very powerful thin head wrench especially adapted for motorists and machinists, and in places where the ordinary wrench will not enter.

8-inch, list price per dozen.... \$12 50

Other sizes in process of manufacture.

Discount.....

Adjustable "S."

The "Perfect Handle" adjustable "S" wrench is far ahead of the ordinary malleable adjustable "S" wrench, and the clumsy drop forged adjustable all steel "S" wrench.

The "Perfect Handle" is the most practical, comfortable and powerful adjustable "S" wrench ever made.

8 inch, list price per dozen.... \$12 50

Othersizes in process of manufacture.



Fig. D. 1400.

Discount.....

New line just out—too late to classify.

“PERFECT HANDLE” TOOLS.

Hatchet.



Fig. D. 1401.

A drop forged hatchet with the unbreakable handle. Top cannot fall off. Blade can be ground down to the head.

No. 2, shingling or family style, price per dozen \$18 00

Discount

Drawing Knife. Razor Blade Style.

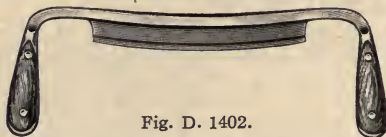


Fig. D. 1402.

Solid best quality crucible steel blade—magnificently tempered. Can be used to the back. Not an iron or cheap steel blade with a stingy narrow strip of fair steel welded on the cutting edge to cut for a little while.

Blade, length, inches	8	10	12
Weight per doz., pounds	18½	20½	22½
Weight per case, pounds	140	153	165
List price per doz	\$16 00	\$18 00	\$20 00

Discount

Packed half dozen in a box.

Six dozen in a case.

Hammer.



Fig. D. 1403.

Drop forged, solid, one piece handles, waterproofed, length 10 inches, face 1 1/8 inches.

Price per dozen \$12 00

Discount

New line just out—too late to classify.

"PERFECT HANDLE" TOOLS.

Screw Drivers.



Fig. D. 1404.

Put a wrench onto the square shank when you want to tighten or loosen cap screws, set screws, etc. Put all the power you wish back of the wrench. The maker's unqualified guarantee is back of the screw driver. Drop-forged of one piece of steel.

Made in two sizes.	No. 9½	No. 10½
Length over all, inches.....	9½	10½
Length of blade, inches.....	4½	5
Size of square, inches.....	7/16	9/16
Width of point, inches.....	1½	2
Thickness of point, inches.....	5/16	3/8
List price, per dozen.....	\$12 00	\$13 00

Discount.....

Packed half dozen in a box. Six dozen in a case.



Fig. D. 1405.

The blade, bolster, handle flat and hammer head are drop-forged of one piece of steel.

Blade length, inches...	2	3	4	5	6	7	8	10	12
Diameter, inches.....	1/4	1/4	1/4	1/4	5/16	5/16	3/8	3/8	3/8
List price, per dozen...	\$4 25	4 25	4 25	5 00	6 00	7 00	8 00	10 00	12 00

Discount.....

Packed half dozen in a box.

2, 3, 4, 5, 6, 7 and 8 inch, twelve dozen in a case.

10 and 12 inch, six dozen in a case.

New line just out—too late to classify.

"PERFECT HANDLE" TOOLS.

Triple Lever Screw Driver.



Fig. D. 1406.
(Enlarged Cut)

By the very simple arrangement of dividing the handle and use of a bolt and thumb nut, spotted on the inside at the joint, the handles are held rigid in any of the positions shown by the illustrations below, allowing a variety of leverages not obtainable in an ordinary screw driver without the use of a wrench or some other tool.

The convenience of being able to apply all the power necessary, and with both hands, on a screw driver is very desirable and makes the "Triple Lever" a necessity with those who desire the best.



Fig. D. 1407.



Fig. D. 1408.



Fig. D. 1409.

Turn the nut and you have the option of three different leverages as shown by the illustrations.

A very strong screw driver for mechanics and automobilists, with point $\frac{1}{4}$ inch wide and $\frac{3}{4}$ inch thick.

A convenient and ingenious arrangement by which the benefit of a variety of extraordinary leverages can be obtained in an instant.

Price per dozen\$18 00

Discount.....

Tack Puller.

A high grade solid forged steel tool, with the waterproof "Perfect Handle." The shoe is beveled and countersunk on the upper part of claw; flat and smooth on the under side. The hammer head is also handy to drive in tacks. A very handy tool for station agents in posting schedules, bulletins, etc.

No. 2, price per dozen\$4 25

Discount.....



Fig. D. 1410.

New line just out—too late to classify.

"SHARPEN EZY" TOOLS.**Nail Set-Cup Pointed.**

Fig. D. 1411.

The fluted handle is very much better to grip than the knurling of such as are made in screw machines.

They are drop forged like all the "Sharpen Ezy" tools and they are accurately tempered, nicely polished and carefully inspected.

Sizes, Nos.	1	2	3
Diameter of point, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$
List price, per dozen.....	\$1 75	\$1 75	\$1 75

Discount.....

Cape Chisel.

Fig. D. 1412.

Solid Punch.

Fig. D. 1413.

Cold Chisel.

Fig. D. 1414.

The "Sharpen Ezy" tools are drop forged, they are tempered all over, they have fluted handles that prevent the tool from slipping around in the hand, tempered so as to permit of tool being sharpened and ground down for years.

Cold Chisels.

Size	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	Assorted
Price, per doz...	\$1 75	\$2 25	\$3 25	\$4 75	\$6 75	\$8 75	\$4 00

Solid Punches.

Price, per doz...	\$2 25	\$3 25
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Cape Chisels.

Price, per doz...	\$2 25	\$3 25
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Discount.....

New line just out—too late to classify.

USEFUL INFORMATION.

WEIGHTS AND MEASURES.

AVOIRDUPOIS OR ORDINARY COMMERCIAL WEIGHT.

British or Long Ton.

Ton.	Cwt.	Pounds.	Ounces.
1	20	2,240	35,840
0.050	1	112	1,792
	0.0089	1	16
		0.0625	1

United States.

Ton.	Cwt.	Pounds.	Ounces.	Grains.
1	20	2,000	32,000	
	1	100	1,600	
		1	16	7,000
			1	437½

1 pound=27.7 cubic inches of distilled water at its maximum density (39° Fahrenheit.)

A Stone is 14 pounds; a Quintal is 100 pounds.

LONG MEASURE.

United States and British.

Miles.	Rods.	Yards.	Feet.	Inches.
1	320	1,760	5,280	63,360
0.003125	1	5.5	16.5	198
0.000568	0.1818	1	3	36
0.0001894	0.0606	0.3333	1	12
0.0000158	0.005051	0.02778	0.08333	1

The British measures are shorter than those of the U. S. by about 1 part in 17,230 or 3,677 inches in a mile.

A Palm is 3 inches.

A Hand is 4 inches.

A Span is 9 inches.

A Fathom is 6 feet.

A Cables Length is 120 fathoms.

A Gunter's or Surveyor's Chain is 66 feet, or 4 rods long, and is divided into 100 links of 7.92 inches in length; 80 chains making a mile.

SQUARE OR LAND MEASURE.

United States and British.

Sq. Miles.	Acres.	Sq. Rods.	Sq. Yards.	Sq. Feet.	Sq. Inches.
1	640 1	102,400 160 1 0.0331	3,097,600 4,840 30.25 1 0.111	27,878,400 43,560 272.25 9 1 0.00694	6,272,640 39,204 1,296 144 1

Acres.....x .0015625. -- square miles.
 Square Yards.....x .000000325-- square miles.
 Acres.....x .4840 -- square miles.
 Square Yards.....x .0002066 -- acres.

A section of land is 1 mile square and contains 640 acres.

A Square Acre is 208.71 feet at each side; or 230x198 feet.

A Square $\frac{1}{4}$ Acre is 147.58 feet at each side; or 110x198 feet.

A Square $\frac{1}{4}$ Acre is 104.355 feet at each side; or 55x198 feet.

A Circular Acre is 235.504 feet in diameter.

A Circular $\frac{1}{4}$ Acre is 166.527 feet in diameter.

A Circular $\frac{1}{4}$ Acre is 117.752 feet in diameter.

CUBIC OR SOLID MEASURE.

United States and British.

1,728 cubic inches--1 cubic foot. 27 cubic feet--1 cubic yard.

A Cord of Wood--4'x4'x8'--128 cubic feet.

A Perch of Masonry--6.5'x1.5'x1'--24.75 cubic feet, but is generally assumed at 25 cubic feet.

LIQUID MEASURE.

This measure is founded upon the old British wine gallon, which contained 231 cubic inches of distilled water at a temperature of 39.85° Fahrenheit, the barometer standing at 30 inches.

4 gills..... -- 1 pint.
 2 pints..... -- 1 quart.
 4 quarts..... -- 1 gallon.
 31½ gallons..... -- 1 barrel.
 2 barrels..... -- 1 hogshead.
 2 hogsheads..... -- 1 pipe, or butt.
 2 pipes..... -- 1 tun

A Puncheon is 84 gallons.

A Tierce is 42 gallons.

THE METRIC SYSTEM.

Dry and Liquid Measure

	Litres.	U. S. Cub. Ins.	U. S.	
Millilitre	= .001	= .061	{ Liquid .00845	Gill.
			{ Dry .0018	Pint.
Centilitre	= .01	= .61	{ Liquid .0845	Gill.
			{ Dry .018	Pint.
Decilitre	= .1	= 6.1	{ Liquid .845	Gill.
			{ Dry .18	Pint.
Litre	= 1.	= 61.02	{ Liquid 2.113	Pints.
			{ Dry 1.8	Pints.
Decalitre	= 10.	= 610.16	{ Liquid 2.641	Gallons.
			{ Dry 9.08	Quarts.
		U. S. Cub. Ft.		
Hectolitre	= 100.	= 3.531	{ Liquid 26.414	Gallons.
			{ Dry 2.837	Bushels.
Kilolitre	= 1000.	= 35.31	{ Liquid 264.141	Gallons.
			{ Dry 28.374	Bushels.
Myrialitre	= 10000.	= 353.1	{ Liquid 2641.4	Gallons.
			{ Dry 283.7	Bushels.

Lineal Measure.

	Metres.	U. S. Ins.	Ft.	Yds.
Millimetre	= .001	= .03937	= .00328	
Centimetre	= .01	= .3937	= .03280	
Decimetre	= .1	= 3.937	= .32807	= .10936
Metre	= 1.	= 39.3685	= 3.2807	= 1.0936
Decametre	= 10.		= 32.807	= 10.936
Hectometre	= 100.		= 328.07	= 109.36
Kilometre	= 1000.		= 3280.7	= 1093.6
Myriametre	= 10000.		= 32807.	= 10936.

Square Measure.

	Sq. Metres.	U. S. Sq. Ins.	Sq. Ft.	Sq. Yds.
Sq. Centimetre	= .01	= .155		
Sq. Decimetre	= .1	= 15.5	= .10763	= .01196
Centiare	= 1.	= 1549.88	= 10.763	= 1.196
Are	= 10.	= 154988.	= 1076.3	= 11959.
Hectare				
Sq. Kilometre	= .38607	Sq. Miles.		
Sq. Myriameter	= 38.607			

Cubic Measure.

	Cub. Metres.	U. S. Cub. Ins.	Cub. Ft.	Cub. Yds.
Cub. Centimetre	= .0001	= .0610165		
Cub. Decimetre	= .001	= 61.0165		
Centistere	= .01	= 610.165	= .353105	
Decistere	= .1	= 6101.65	= 3.53105	= .13078
Stere	= 1.		= 35.3105	= 1.3078
Decastere	= 10.		= 353.105	= 13.078
Hectostere	= 100.		= 3531.05	= 130.78

MENSURATION.

Properties of the Circle.

Diameter x 3.14159=circumference.

Diameter x .8862=side of an equal square.

Diameter x .7071=side of an inscribed square.

Diameter² x .7854=area of a circle.

Radius x 6.28318=circumference.

Circumference ÷ 3.14159=diameter.

1st. The circle contains a greater area than any plane figure, bounded by an equal perimeter or outline.

2d. The areas of circles are to each other as the squares of their diameters.

3d. Any circle whose diameter is double that of another contains four times the area of the other.

4th. Area of a circle is equal to the area of a triangle whose base equals the circumference, and perpendicular equals the radius.

Area of Circles and Their Circumference.

Dia.	Area.	Cir.	Dia.	Area.	Cir.	Dia.	Area.	Cir.	Dia.	Area.	Cir.
$\frac{1}{16}$	0.0123	.3926	10	78.54	31.41	30	706.86	94.24	65	3318.3	204.2
$\frac{1}{8}$	0.0491	.7854	10 $\frac{1}{2}$	86.59	32.98	31	754.76	97.38	66	3421.2	207.3
$\frac{3}{16}$	0.1104	1.178	11	95.03	34.55	32	804.24	100.5	67	3525.6	210.4
$\frac{1}{4}$	0.1963	1.570	11 $\frac{1}{2}$	103.86	36.12	33	855.30	103.6	68	3631.6	213.6
$\frac{5}{16}$	0.3067	1.963	12	113.09	37.69	34	907.92	106.8	69	3739.2	216.7
$\frac{3}{8}$	0.4417	2.356	12 $\frac{1}{2}$	122.71	39.27	35	962.11	109.9	70	3848.4	219.9
$\frac{7}{16}$	0.6013	2.748	13	132.73	40.84	36	1017.8	113.0	71	3959.2	223.0
1	0.7854	3.141	13 $\frac{1}{2}$	143.13	42.41	37	1075.2	116.2	72	4071.5	226.1
1 $\frac{1}{16}$	0.9940	3.534	14	153.93	43.98	38	1134.1	119.3	73	4185.3	229.3
1 $\frac{1}{8}$	1.227	3.927	14 $\frac{1}{2}$	165.13	45.55	39	1194.5	122.5	74	4300.8	232.4
1 $\frac{3}{16}$	1.484	4.319	15	176.71	47.12	40	1256.6	125.6	75	4417.8	235.6
1 $\frac{1}{4}$	1.767	4.712	15 $\frac{1}{2}$	188.69	48.69	41	1320.2	128.8	76	4536.4	238.7
1 $\frac{5}{16}$	2.073	5.105	16	201.06	50.26	42	1385.4	131.9	77	4656.0	241.9
1 $\frac{3}{8}$	2.405	5.497	16 $\frac{1}{2}$	213.82	51.83	43	1452.2	135.0	78	4778.3	245.0
1 $\frac{7}{16}$	2.761	5.890	17	226.98	53.40	44	1520.5	138.2	79	4901.6	248.1
2	3.141	6.283	17 $\frac{1}{2}$	240.52	54.97	45	1590.4	141.3	80	5026.5	251.3
2 $\frac{1}{16}$	3.976	7.068	18	254.46	56.54	46	1661.9	144.5	81	5153.0	254.4
2 $\frac{1}{8}$	4.908	7.854	18 $\frac{1}{2}$	268.80	58.11	47	1734.9	147.6	82	5281.0	257.6
2 $\frac{3}{16}$	5.939	8.639	19	283.52	59.69	48	1809.5	150.7	83	5410.6	260.7
3	7.068	9.424	19 $\frac{1}{2}$	298.64	61.26	49	1885.7	153.9	84	5541.7	263.8
3 $\frac{1}{16}$	8.295	10.21	20	314.16	62.83	50	1963.5	157.0	85	5674.5	267.0
3 $\frac{1}{8}$	9.621	10.99	20 $\frac{1}{2}$	330.06	64.40	51	2042.8	160.2	86	5808.8	270.1
3 $\frac{3}{16}$	11.044	11.78	21	346.36	65.97	52	2123.7	163.3	87	5944.6	273.3
4	12.566	12.56	21 $\frac{1}{2}$	363.05	67.54	53	2206.1	166.5	88	6082.1	276.4
4 $\frac{1}{16}$	15.904	14.13	22	380.13	69.11	54	2290.2	169.6	89	6221.1	279.6
5	19.635	15.70	22 $\frac{1}{2}$	397.60	70.68	55	2375.8	172.7	90	6361.7	282.7
5 $\frac{1}{16}$	23.758	17.27	23	415.47	72.25	56	2463.0	175.9	91	6503.8	285.8
6	28.274	18.84	23 $\frac{1}{2}$	433.73	73.82	57	2551.7	179.0	92	6647.6	289.0
6 $\frac{1}{16}$	33.183	20.42	24	452.39	75.39	58	2642.0	182.2	93	6792.9	292.1
7	38.484	21.99	24 $\frac{1}{2}$	471.43	76.96	59	2733.9	185.3	94	6939.7	295.3
7 $\frac{1}{16}$	44.178	23.56	25	490.87	78.54	60	2827.4	188.4	95	7088.2	298.4
8	50.265	25.13	26	530.93	81.68	61	2922.4	191.6	96	7238.2	301.5
8 $\frac{1}{16}$	56.745	26.70	27	572.55	84.82	62	3019.0	194.7	97	7389.8	304.7
9	63.617	28.27	28	615.75	87.96	63	3117.2	197.9	98	7542.9	307.8
9 $\frac{1}{16}$	70.882	29.84	29	660.52	91.10	64	3216.9	201.0	99	7697.7	311.0

CONTENTS OF ROUND TANKS.

In U. S. Gallons for Each Foot in Depth.

Diameter.		Gallons, 1 Foot in Depth.	Diameter.		Gallons, 1 Foot in Depth.	Diameter.		Gallons 1 Foot in Depth.
Ft.	In.		Ft.	In.		Ft.	In.	
1	0	5.8735	11	0	710.6977	21	0	2,590.2290
1	3	9.1766	11	3	773.3686	21	3	2,652.2532
1	6	13.2150	11	6	776.7746	21	6	2,715.0413
1	9	17.9870	11	9	810.9143	21	9	2,778.5486
2	0	23.4940	12	0	848.1890	22	0	2,842.7910
2	3	29.7340	12	3	881.3966	22	3	2,907.7664
2	6	36.7092	12	6	917.7395	22	6	2,973.4889
2	9	44.4179	12	9	954.8159	22	9	3,039.9209
3	0	52.8618	13	0	992.6274	23	0	3,107.1001
3	3	62.0386	13	3	1,031.1719	23	3	3,175.0122
3	6	73.1504	13	6	1,070.4514	23	6	3,243.6595
3	9	82.5959	13	9	1,108.0645	23	9	3,313.0403
4	0	93.9754	14	0	1,151.2129	24	0	3,383.1563
4	3	103.0300	14	3	1,192.6940	24	3	3,454.0051
4	6	118.9386	14	6	1,234.9104	24	6	3,525.5929
4	9	132.5209	14	9	1,277.8615	24	9	3,597.9068
5	0	146.8384	15	0	1,321.5454	25	0	3,670.9596
5	3	161.8886	15	3	1,365.9634	25	3	3,744.7452
5	6	177.6740	15	6	1,407.5165	25	6	3,819.2657
5	9	194.1913	15	9	1,457.0032	25	9	3,894.5203
6	0	211.4472	16	0	1,503.6250	26	0	3,970.5098
6	3	229.4342	16	3	1,550.9797	26	3	4,047.2322
6	6	248.1564	16	6	1,599.0696	26	6	4,124.6898
6	9	267.6122	16	9	1,647.8930	26	9	4,202.9610
7	0	287.8032	17	0	1,697.4516	27	0	4,281.8072
7	3	308.7270	17	3	1,747.7431	27	3	4,361.4664
7	6	330.3859	17	6	1,798.7698	27	6	4,441.8607
7	9	352.7665	17	9	1,850.5301	27	9	4,522.9886
8	0	375.9062	18	0	1,903.0254	28	0	4,604.8517
8	3	399.7666	18	3	1,956.2537	28	3	4,686.4876
8	6	424.3625	18	6	2,010.2171	28	6	4,770.7787
8	9	449.2118	18	9	2,064.9140	28	9	4,854.8434

THE EFFECT OF HEAT ON VARIOUS SUBSTANCES.

Melting Point.	Melting Point.	Boiling Point.
Antimony..... 951°	Platinum..... 3,080°	Mercury..... .662°
Bismuth..... 476°	Silver..... 1,250°	Naphtha..... .186°
Brass..... 1,900°	Steel..... 2,500°	Fresh water.... .212°
Copper..... 2,548°	Tin..... 421°	Sea water..... 213.2°
Glass..... 2,377°	Zinc..... 740°	Ether..... .100°
Gold..... 2,590°	Ice..... 32°	Oil turpentine... 304°
Cast Iron..... 3,479°		Linseed Oil.... .640°
Lead..... 594°		Sweet Oil..... 412°

MELTING TEMPERATURE OF ALLOYS.

Lead 3, Tin 5, Bismuth 8	208°
Lead 1, Tin 3, Bismuth 5	212°
Lead 1, Tin 4, Bismuth 5	240°
Tin 1, Bismuth 1	286°
Lead 2, Tin 3	334°
Tin 2, Bismuth 1	336°
Lead 1, Tin 2	360°
Tin 8, Bismuth 1	392°
Lead 2, Tin 1	475°

PROPORTIONS OF VARIOUS COMPOSITIONS IN
COMMON USE.

(In 100 parts.)

Babbitt's Metal.....	Tin 89 Copper 3.7, Antimony 7.3.
Fine Yellow Brass.....	Copper 66, Zinc 34.
Gun Metal, Valves, etc.....	Copper 90, Tin 10
White Brass.....	Copper 10, Zinc 80, Tin 10.
German Silver	Copper 33.3, Zinc 33.4, Nickel 33.3
Church Bells.....	Copper 80, Zinc 5.6, Tin 10.1, Lead 4.3.
Gongs.....	Copper 81.6, Tin 18.4.
Lathe Bushes.....	Copper 80, Tin 20.
Machinery Bearings.....	Copper 87.5, Tin 12.5.
Muntz Metal.....	Copper 60, Zinc 40.
Sheathing Metal.....	Copper 56, Zinc 44.

SHRINKAGE OF CASTINGS.

In locomotive cylinders is $\frac{1}{16}$ inch in a foot.
Pipes is $\frac{1}{8}$ inch in a foot.
Girders, beams, etc., is $\frac{1}{8}$ inch in 15 inches.
Engine beams, connecting rods, etc., is $\frac{1}{8}$ inch in 16 inches.
Large cylinders, say 70 inch diameter, 10-ft. stroke, the contraction of diameter is $\frac{3}{8}$ inch at top, $\frac{1}{2}$ inch at bottom, and $\frac{1}{2}$ inch in 16 inches in length.
Thin brass is $\frac{1}{8}$ inch in 9 inches.
Thick brass is $\frac{1}{4}$ inch in 10 inches.
Zinc is $\frac{1}{16}$ inch in a foot.
Lead is $\frac{1}{16}$ inch in a foot.
Copper is $\frac{1}{8}$ inch in a foot.
Bismuth is $\frac{1}{16}$ inch in a foot.
Tin is $\frac{1}{4}$ inch in a foot.

WEIGHTS OF VARIOUS SUBSTANCES.

Per Cubic Foot.

Names of Substances.	Aver. Weight Lbs.
Anthracite, solid, of Pennsylvania.....	93
“ broken, loose.....	54
“ “ moderately shaken.....	58
“ heaped, bushel, loose.....	80
Ash, American white, dry.....	38
Asphaltum.....	87
Brass (Copper and Zinc) cast.....	504
“ rolled.....	524
Brick, best pressed.....	150
“ common, hard.....	125
“ soft, inferior.....	100
Brickwork, pressed brick.....	140
“ ordinary.....	112
Cement, hydraulic ground, loose, American, Rosendale.....	56
“ “ “ “ Louisville.....	50
“ “ “ “ English, Portland.....	90
Cherry, dry.....	42
Chestnut, dry.....	41
Coal, bituminous, solid.....	84
“ “ broken, loose.....	49
“ “ heaped bushel, loose.....	74
Coke, loose, of good coal.....	27
“ heaped bushel.....	38
Copper, cast.....	542
“ rolled.....	548
Earth, common loam, dry, loose.....	76
“ “ moderately rammed.....	95
“ as a soft flowing mud.....	108
Ebony, dry.....	76
Elm, dry.....	35
Flint.....	162
Glass, common Window.....	157
Gneiss, common.....	168
Gold, cast, pure, or 24 carat.....	1,204
“ pure hammered.....	1,217
Granite.....	170
Gravel, about the same as sand, which see.....	
Hemlock, dry.....	25
Hickory, dry.....	53
Hornblende, black.....	203
Ice.....	58.7
Iron, cast.....	450
“ wrought, purest.....	485
“ “ average.....	480
Ivory.....	114
Lead.....	711
Lignum Vitae, dry.....	83
Lime, quick ground, loose, or in small lumps.....	53
“ “ “ “ thoroughly shaken.....	75
“ “ “ “ per struck bushel.....	66

WEIGHTS OF VARIOUS SUBSTANCES—Continued.

Per Cubic Foot.

Names of Substances	Aver. Weight. Lbs.
Limestones and Marbles.....	168
“ “ “ loose, in irregular fragments.....	96
Mahogany, Spanish, dry.....	53
“ Honduras, dry.....	35
Maple, dry.....	49
Marbles, see Limestones.	
Masonry, of granite or limestone, well dressed.....	165
“ of mortar rubble.....	154
“ of dry rubble, well scabbled.....	138
“ of sandstone, well dressed.....	144
Mercury, at 32° Fahrenheit.....	849
Mica.....	183
Mortar, hardened.....	103
Mud, dry, close.....	80 to 110
“ wet, fluid, maximum.....	120
Oak, live, dry.....	59
“ white, dry.....	52
“ other kinds.....	32 to 45
Petroleum.....	55
Pine, white, dry.....	25
“ yellow, Northern.....	34
“ “ Southern.....	45
Platinum.....	1,342
Quartz, common, pure.....	165
Rosin.....	69
Salt, coarse, Syracuse, N. Y.....	45
“ Liverpool, fine for table use.....	49
Sand, of pure quartz, dry, loose.....	90 to 106
“ well shaken.....	99 to 117
“ perfectly wet.....	120 to 140
Sandstones, fit for building.....	151
Shales, red or black.....	162
Silver.....	651
Slate.....	175
Snow, freshly fallen.....	5 to 12
“ moistened and compacted by rain.....	15 to 50
Spruce, dry.....	25
Steel.....	490
Sulphur.....	125
Sycamore, dry.....	37
Tar.....	62
Tin, cast.....	459
Turf or Peat, dry, unpressed.....	20 to 30
Walnut, black, dry.....	38
Water, pure rain or distilled, at 60° Fahrenheit.....	62½
“ sea.....	64
Wax, bees.....	60½
Zinc or Spelter.....	437

Green timbers usually weigh from one-fifth to one-half more than dry.

FLAT BAR STEEL.

Weight per Lineal Foot.

Width in Inches.	Thickness in Inches.										
	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
1	.21	.43	.638	.850	1.06	1.28	1.49	1.70	2.12	2.55	2.98
1 $\frac{1}{4}$	.24	.48	.720	.955	1.20	1.43	1.68	1.92	2.39	2.87	3.35
1 $\frac{1}{2}$	.27	.53	.797	1.06	1.33	1.59	1.86	2.12	2.65	3.19	3.72
1 $\frac{3}{4}$	.30	.59	.875	1.17	1.46	1.76	2.05	2.34	2.92	3.51	4.09
1 $\frac{7}{8}$	.32	.64	.957	1.28	1.59	1.92	2.23	2.55	3.19	3.83	4.47
1 $\frac{15}{16}$	.35	.69	1.04	1.38	1.73	2.08	2.42	2.77	3.46	4.15	4.84
1 $\frac{1}{2}$	.38	.75	1.11	1.49	1.86	2.23	2.60	2.98	3.72	4.47	5.20
2	.43	.85	1.28	1.70	2.12	2.55	2.98	3.40	4.25	5.10	5.95
2 $\frac{1}{4}$	.48	.96	1.44	1.91	2.39	2.87	3.35	3.83	4.78	5.75	6.69
2 $\frac{1}{2}$	.53	1.06	1.59	2.12	2.65	3.19	3.72	4.25	5.31	6.38	7.44
2 $\frac{3}{4}$	.59	1.17	1.75	2.34	2.92	3.51	4.09	4.67	5.84	7.02	8.18
3	.64	1.28	1.91	2.55	3.19	3.83	4.46	5.10	6.38	7.65	8.93
3 $\frac{1}{4}$	.69	1.38	2.07	2.76	3.45	4.15	4.83	5.53	6.91	8.29	9.67
3 $\frac{1}{2}$	.75	1.49	2.23	2.98	3.72	4.47	5.20	5.95	7.44	8.93	10.41
3 $\frac{3}{4}$	.80	1.60	2.39	3.19	3.99	4.78	5.58	6.38	7.97	9.57	11.16
4	.85	1.70	2.55	3.40	4.25	5.10	5.95	6.80	8.50	10.20	11.90
4 $\frac{1}{4}$	.96	1.92	2.87	3.83	4.78	5.74	6.70	7.65	9.57	11.48	13.39
4 $\frac{1}{2}$	1.07	2.13	3.19	4.25	5.31	6.38	7.44	8.50	10.63	12.75	14.87
5 $\frac{1}{4}$	1.17	2.34	3.51	4.67	5.84	7.02	8.18	9.35	11.69	14.03	16.36
5 $\frac{1}{2}$	1.23	2.55	3.83	5.10	6.38	7.65	8.93	10.20	12.75	15.30	17.85
6	1.49	2.98	4.46	5.95	7.44	8.93	10.41	11.90	14.87	17.85	20.83
8	1.70	3.40	5.10	6.80	8.50	10.20	11.90	13.60	17.00	20.40	23.80

TANK STEEL.

Weight of Superficial Foot.

Thickness in Inches		Weight in Pounds, Steel.	Thickness in Inches		Weight in Pounds, Steel.
$\frac{1}{16}$ =	.03125.....	1.30	$\frac{1}{16}$ =	.3125.....	12.88
$\frac{1}{8}$ =	.0625.....	2.57	$\frac{1}{8}$ =	.375.....	15.46
$\frac{1}{4}$ =	.09375.....	3.87	$\frac{1}{4}$ =	.4375.....	18.03
$\frac{3}{8}$ =	.125.....	5.15	$\frac{3}{8}$ =	.5.....	20.61
$\frac{1}{2}$ =	.15625.....	6.45	$\frac{1}{2}$ =	.5625.....	23.19
$\frac{5}{8}$ =	.1875.....	7.73	$\frac{5}{8}$ =	.625.....	25.77
$\frac{3}{4}$ =	.21875.....	9.02	$\frac{3}{4}$ =	.75.....	30.92
$\frac{7}{8}$ =	.25.....	10.30	$\frac{7}{8}$ =	.875.....	36.08
$\frac{15}{16}$ =	.28123.....	11.61	1 = 1	.....	41.23

The low temperature (as compared with iron) at which steel plates have to be finished, causes a slight springing of the rolls, leaving the plate thicker in the center. This, combined with greater density, causes steel plates if kept up to full thickness on the edges, to weigh more than iron. Both iron and steel over 72 inches wide are liable to run even heavier than the weights given above.

ROUND AND SQUARE STEEL BARS.

Weight per Lineal Foot, from $\frac{1}{8}$ to 8-Inch

Size in Inches.	Rounds, Weight in Lbs.	Squares, Weight in Lbs.	Size in Inches.	Rounds, Weight in Lbs.	Squares, Weight, in Lbs.
$\frac{1}{8}$	.094	.120	$2\frac{1}{8}$	12.06	15.36
$\frac{1}{4}$	.167	.213	$2\frac{1}{4}$	13.52	17.22
$\frac{3}{8}$	.261	.332	$2\frac{3}{8}$	15.07	19.19
$\frac{1}{2}$	.375	.478	$2\frac{1}{2}$	16.70	21.26
$\frac{5}{8}$	.511	.651	$2\frac{3}{4}$	18.41	23.44
$\frac{3}{4}$	.668	.851	$2\frac{7}{8}$	20.21	25.73
$\frac{7}{8}$	.845	1.076	3	24.05	30.62
1	1.044	1.329	$3\frac{1}{8}$	28.23	35.94
$1\frac{1}{8}$	1.503	1.914	$3\frac{1}{4}$	32.74	41.68
$1\frac{1}{4}$	2.046	2.605	$3\frac{3}{8}$	37.57	47.84
$1\frac{1}{2}$	2.672	3.402	4	42.77	54.45
$1\frac{3}{4}$	3.382	4.306	$4\frac{1}{4}$	54.83	69.81
2	4.175	5.316	5	66.82	85.08
$2\frac{1}{8}$	5.052	6.432	$5\frac{1}{8}$	80.85	102.94
$2\frac{1}{4}$	6.012	7.655	6	96.22	122.51
$2\frac{3}{8}$	7.056	8.984	$6\frac{1}{8}$	112.92	143.78
$2\frac{1}{2}$	8.183	10.419	7	130.97	166.75
$2\frac{3}{4}$	9.394	11.961	$7\frac{1}{8}$	150.34	191.42
3	10.69	13.61	8	171.04	217.78

SHEET STEEL.

Weight of Superficial Foot.

Gauge.	Thickness.		Weight in Pounds.		Gauge.	Thickness.		Weight in Pounds.	
	U. S. Stand.	Stubs'.	U. S. Stand.	Stubs'.		U. S. Stand.	Stubs'.	U. S. Stand.	Stubs'.
1	.281	.300	11.25	12.20	16	.063	.065	2.50	2.64
2	.266	.284	10.63	11.63	17	.056	.058	2.25	2.36
3	.250	.259	10.00	10.53	18	.050	.049	2.00	1.99
4	.234	.238	9.38	9.68	19	.044	.042	1.75	1.71
5	.219	.220	8.75	8.95	20	.038	.035	1.50	1.42
6	.203	.203	8.13	8.25	21	.034	.032	1.38	1.30
7	.188	.180	7.50	7.32	22	.031	.028	1.25	1.14
8	.172	.165	6.88	6.71	23	.028	.025	1.13	1.02
9	.156	.148	6.25	6.02	24	.025	.022	1.00	.90
10	.141	.134	5.63	5.45	25	.022	.020	.87	.81
11	.125	.120	5.00	4.88	26	.019	.018	.75	.73
12	.109	.109	4.38	4.43	27	.017	.016	.69	.65
13	.094	.095	3.75	3.86	28	.016	.014	.63	.60
14	.078	.083	3.13	3.37	29	.014	.013	.56	.53
15	.070	.072	2.82	2.93	30	.013	.012	.50	.49

GENERAL RULES

For Determining the Weight of Any Piece of Wrought Iron.

One cubic foot of wrought iron.....	= 480 lbs.
One square foot, one inch thick.....	= $480 \div 12 = 40$ "
One square inch, one foot long.....	= $40 \div 12 = 3\frac{1}{3}$ "
One square inch, one yard long.....	= $3\frac{1}{3} \times 3 = 10$ "

Hence, the weight of any piece of wrought iron in pounds per yard is equal to ten times its area in square inches.

Example. The area of a bar $3'' \times 1'' = 3$ square inches, and its weight is 30 pounds per yard.

For round iron the weight per foot may be found by taking the diameter in quarter inches, squaring it, and dividing by 6.

Example.—What is the weight of 2" round iron?

$$2'' = 8 \text{ quarter inches. } 8^2 = 64.$$

$$64 \div 6 = 10\frac{2}{3} \text{ lbs. per foot of 2'' round.}$$

Example.—What is the weight of $\frac{3}{4}''$ round iron?

$$\frac{3}{4}'' = 3 \text{ quarter inches. } 3^2 = 9.$$

$$9 \div 6 = 1\frac{1}{2} \text{ lbs. per foot of } \frac{3}{4}'' \text{ round.}$$

The above rules are highly convenient, and enable mental calculations of weight to be quickly obtained with accuracy.

STRENGTH OF MATERIALS.

Ultimate Tensile Strength in Lbs. per Square Inch.

Metals.	Average.
Brass, cast.....	18,000
" wire.....	49,000
Bronze, or gun metal.....	36,000
Copper, cast.....	19,000
" sheet.....	30,000
" wire.....	60,500
Iron, cast, 13,400 to 29,000.....	16,000
" wrought, ordinary bar.....	45,000
" " double refined.....	50,000 to 54,000
" " boiler plates.....	48,000 to 56,000
" wire.....	70,000 to 100,000
" ropes.....	90,000
Lead, cast.....	2,000
" pipe.....	1,650
Steel.....	65,000 to 120,000
Tin.....	4,600
Zinc.....	3,500

A bar of wrought iron will expand or contract $\frac{1}{51200}$ th of its length for each degree of heat; and assuming that the extreme range of temperature in this country is 140° , it will expand or contract with this change the $\frac{1}{1080}$ th of its length which is equivalent to a force of 20,740 lbs., or $9\frac{1}{4}$ tons per square inch of section. The tensile strength is increased in from 1 to 6 reheatings and rollings, from 43,904 to 61,824 lbs., and decreased again to 43,904 lbs. in from 6 to 12.

The tensile strength at different temperatures is as follows: 60° , 1; 114° , 1.14; 212° , 1.2; 250° , 1.32; 270° , 1.35; 325° , 1.41; 435° , 1.4.

MACHINE BOLTS.

With Square Heads and Nuts

Approximate weight in pounds of 100 bolts of sizes enumerated below.

Length Inches	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
$1\frac{1}{2}$	3.7	6.0	9.0	15.2	19.6	27.5	34.3	54.3	.....	.....	.....	.....
2	4.2	7.0	10.5	17.2	22.2	31.0	38.4	60.0	90.8	.....	.....	.....
$2\frac{1}{2}$	4.8	8.0	12.0	19.2	24.8	34.5	42.5	65.7	99.1	148.2	209.0	277.0
3	5.5	9.0	13.5	21.2	27.5	38.0	46.7	71.4	107.4	159.0	222.5	293.5
$3\frac{1}{2}$	6.1	10.0	15.0	23.2	30.1	41.5	50.8	77.1	115.7	169.8	236.0	310.0
4	6.8	11.0	16.5	25.2	32.8	45.0	55.0	82.8	124.0	180.6	249.5	326.5
$4\frac{1}{2}$	7.4	12.0	18.0	27.2	35.4	48.5	59.1	88.9	132.3	191.4	263.0	343.0
5	8.1	13.0	19.5	29.2	38.1	52.0	63.3	95.0	140.6	202.2	276.5	359.5
$5\frac{1}{2}$	8.7	14.0	21.0	31.2	40.7	55.5	67.4	101.1	148.9	213.0	290.0	376.0
6	9.4	15.0	22.5	33.2	43.4	59.0	71.6	107.2	157.2	223.8	303.5	392.5
$6\frac{1}{2}$	10.1	16.0	24.1	35.2	46.0	62.5	75.7	113.3	165.5	234.6	317.0	409.0
7	10.8	17.0	25.7	37.2	48.7	66.0	79.9	119.4	173.8	245.4	330.5	425.5
$7\frac{1}{2}$	11.5	18.0	27.3	39.2	51.3	69.5	84.0	125.5	182.1	256.2	344.0	442.0
8	12.2	19.0	28.9	41.2	54.0	73.0	88.2	131.6	190.4	267.0	357.5	458.5
9	.....	.....	32.1	45.2	59.5	80.0	96.5	143.8	207.0	288.6	385.5	493.0
10	.....	.....	35.3	49.2	65.0	87.0	104.8	156.0	223.6	310.2	413.5	527.5
11	.....	.....	38.5	53.2	70.5	94.0	113.1	168.2	240.2	331.8	441.5	562.0
12	.....	.....	41.7	57.2	76.0	101.0	121.4	180.4	256.8	353.4	469.5	596.5
13	.....	.....	.....	.....	81.5	108.0	129.7	192.6	273.4	375.0	497.5	631.0
14	.....	.....	.....	.....	87.0	115.0	138.0	204.8	290.0	396.6	525.5	665.5
15	.....	.....	.....	.....	92.5	122.0	146.3	217.0	306.6	418.2	553.5	700.0
16	.....	.....	.....	.....	98.0	129.0	154.6	229.2	323.2	439.8	581.5	734.5
17	.....	.....	.....	.....	103.5	136.0	162.9	241.4	339.8	461.4	609.5	769.0
18	.....	.....	.....	.....	109.0	143.0	171.2	253.6	356.4	483.0	637.5	803.5
19	.....	.....	.....	.....	114.5	150.0	179.5	265.8	373.0	504.6	665.5	838.0
20	.....	.....	.....	.....	120.0	157.0	187.8	278.0	389.6	526.2	693.5	872.5
21	.....	.....	.....	.....	.....	.....	.....	290.4	406.5	548.2	721.5	907.0
22	.....	.....	.....	.....	.....	.....	.....	302.8	423.4	570.2	749.5	941.5
23	.....	.....	.....	.....	.....	.....	.....	315.2	440.3	592.2	777.5	976.0
24	.....	.....	.....	.....	.....	.....	.....	327.6	457.2	614.2	805.5	1010.5
25	.....	.....	.....	.....	.....	.....	.....	340.0	474.1	636.2	833.5	1045.0
26	.....	.....	.....	.....	.....	.....	.....	352.4	491.0	658.2	861.5	1079.5
27	.....	.....	.....	.....	.....	.....	.....	364.8	507.9	680.2	889.5	1114.0
28	.....	.....	.....	.....	.....	.....	.....	377.2	524.8	702.2	917.5	1148.5
29	.....	.....	.....	.....	.....	.....	.....	389.6	541.7	724.2	945.5	1183.0
30	.....	.....	.....	.....	.....	.....	.....	402.0	558.6	746.2	973.5	1217.5

NAILS.

Length and Number to the Pound.

WIRE.

Size.	Length.	Description.						
		Common.	Clinch.	Fence.	Finishing.	Casing.	Brads.	Spikes.
2d.....	1 inch.	876	710	.....	1,351	1,010	.....	.....
3d.....	1½ "	568	429	.....	807	635	.....	.....
4d.....	1½ "	316	274	.....	584	473	.....	.....
5d.....	1½ "	271	235	142	500	406	.....	.....
6d.....	2 "	181	157	124	309	236	157	.....
7d.....	2½ "	161	139	92	238	210	139	.....
8d.....	2½ "	106	99	82	189	145	99	.....
9d.....	2½ "	96	90	62	172	132	90	.....
10d.....	3 "	69	69	50	121	94	69	40
12d.....	3½ "	63	62	40	113	87	54	37
16d.....	3½ "	49	49	30	90	71	43	30
20d.....	4 "	31	37	23	62	52	31	22
30d.....	4½ "	24	.....	.....	.....	46	.....	17
40d.....	5 "	18	.....	.....	.....	35	.....	13
50d.....	5½ "	14	.....	.....	.....	.....	.....	10
60d.....	6 "	11	.....	.....	.....	.....	.....	9

TABLE

Showing the Number of Feet, Board Measure, Contained in a Piece of Joist, Scantling or Timber of the Sizes Given.

Size in Inches.	Length in Feet of Joists, Scantling and Timber.												
	12	14	16	18	20	22	24	26	28	30	42	44	45
2x 4.....	8	9	11	12	13	15	16	17	19	20	28	29	30
2x 6.....	12	14	16	18	20	22	24	26	28	30	42	44	45
2x 8.....	16	19	21	24	27	29	32	35	37	40	53	58	60
2x10.....	20	23	27	30	33	37	40	43	47	50	70	74	75
2x12.....	24	28	32	36	40	44	48	52	56	60	84	88	90
3x 4.....	12	14	16	18	20	22	24	26	28	30	42	44	45
3x 6.....	18	21	24	27	30	33	36	39	42	45	63	66	68
3x 8.....	24	28	32	36	40	44	48	52	56	60	84	88	90
3x10.....	30	35	40	45	50	55	60	65	70	75	105	110	113
3x12.....	36	42	48	54	60	66	72	78	84	90	126	132	135
4x 4.....	16	19	21	24	27	29	32	35	37	40	56	58	60
4x 6.....	24	28	32	36	40	44	48	52	56	60	84	88	90
4x 8.....	32	37	43	48	53	59	64	69	75	80	112	118	120
4x10.....	40	47	53	60	67	73	80	87	93	100	140	146	150
4x12.....	48	56	64	72	80	88	96	104	112	120	168	176	180
6x 6.....	36	42	48	54	60	66	72	78	84	90	126	132	130
6x 8.....	48	56	64	72	80	88	96	104	112	120	168	176	180
6x10.....	60	70	80	90	100	110	120	130	140	150	210	220	225
6x12.....	72	84	96	108	120	132	144	156	168	180	250	265	270
8x 8.....	64	75	85	96	107	117	128	139	149	160	224	234	240
8x10.....	80	93	107	120	133	147	160	173	187	200	280	294	300
8x12.....	96	112	128	144	160	176	192	208	224	240	336	352	360
10x10.....	100	117	133	150	167	183	200	217	233	250	350	366	375
10x12.....	120	140	160	180	200	220	240	260	280	300	420	440	450
12x12.....	144	168	192	216	240	264	288	312	336	360	504	528	540
12x14.....	168	196	224	252	280	308	336	364	392	420	588	616	630
14x14.....	196	229	261	294	327	359	392	425	457	490	686	716	735

RULE

For Finding the Weight of Castings or Forgings by the Weight of Their Patterns.

Multiply the weight of the white pine pattern by

- 16 for cast iron.,
- 17.1 " wrought iron.
- 17.3 " steel,
- 18 " copper,
- 25 " lead,
- 12.2 " tin,
- 13 " brass,
- 11.4 " zinc,

and the product is the weight of the casting.

ROUND COPPER RODS.

Diameter.	Weight per Foot.	W't per ft. in length.
$\frac{3}{8}$ inch.....		.424 lbs.
$\frac{7}{16}$ ".....		.755 "
$\frac{1}{2}$ ".....		1.19 "
$\frac{5}{8}$ ".....		1.69 "
$\frac{3}{4}$ ".....		2.31 "
$\frac{7}{8}$ ".....		3.02 "
1 ".....		3.82 "
$1\frac{1}{8}$ ".....		4.71 "
$1\frac{1}{4}$ ".....		5.71 "
$1\frac{3}{8}$ ".....		6.79 "
$1\frac{1}{2}$ ".....		7.94 "
$1\frac{3}{4}$ ".....		9.21 "
$1\frac{7}{8}$ ".....		10.61 "
2 ".....		12.08 "

ROUND BRASS RODS.

Diameter.	Weight per Foot.	W't per ft. in length.
$\frac{3}{8}$ inch.....		.411 lbs.
$\frac{7}{16}$ ".....		.731 "
$\frac{1}{2}$ ".....		1.13 "
$\frac{5}{8}$ ".....		1.64 "
$\frac{3}{4}$ ".....		2.24 "
$\frac{7}{8}$ ".....		2.93 "
1 ".....		3.70 "
$1\frac{1}{8}$ ".....		4.56 "
$1\frac{1}{4}$ ".....		5.53 "
$1\frac{3}{8}$ ".....		6.57 "
$1\frac{1}{2}$ ".....		7.69 "
$1\frac{3}{4}$ ".....		8.92 "
$1\frac{7}{8}$ ".....		10.28 "
2 ".....		11.70 "

METALS.

Weight per Square Foot.

Thickness.	Wrought Iron.	Cast Iron.	Steel.	Copper.	Brass	Lead.	Zinc.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
$\frac{1}{16}$ inch.....	2.51	2.34	2.55	2.89	2.67	3.69	2.34
$\frac{1}{8}$ ".....	5.03	4.69	5.10	5.78	5.35	7.38	4.68
$\frac{3}{16}$ ".....	7.58	7.03	7.66	8.67	8.02	11.07	7.02
$\frac{1}{4}$ ".....	10.07	9.38	10.21	11.56	10.7	14.76	9.36
$\frac{5}{16}$ ".....	12.58	11.73	12.76	14.45	13.37	18.45	11.7
$\frac{3}{8}$ ".....	15.10	14.07	15.31	17.34	16.05	22.14	14.04
$\frac{1}{2}$ ".....	17.62	16.42	17.87	20.23	18.72	25.83	16.34
$\frac{5}{8}$ ".....	20.14	18.77	20.42	23.12	21.4	29.53	18.72
$\frac{3}{4}$ ".....	22.65	21.11	22.97	26.01	24.07	33.22	21.08
$\frac{7}{8}$ ".....	25.17	23.46	25.52	28.90	26.75	36.91	23.44
1 ".....	27.69	25.81	28.08	31.97	29.42	40.60	25.80
$1\frac{1}{8}$ ".....	30.21	28.15	30.63	34.68	32.1	44.29	28.13
$1\frac{1}{4}$ ".....	32.72	30.50	33.18	37.57	35.19	47.98	30.49
$1\frac{3}{8}$ ".....	35.24	32.85	35.73	40.69	38.28	51.67	32.81
$1\frac{1}{2}$ ".....	37.76	35.19	38.28	43.35	41.37	55.37	35.17
1 1/2 ".....	40.28	37.54	40.83	46.25	43.75	59.06	37.50

TABLE OF WEIGHTS OF SHEET COPPER.

Per Square Foot, and Thickness per Stub's Wire Gauge.

Roller copper has specific gravity of 8.93. One cubic foot weighs $558\frac{125}{1000}$ lbs.
 One square foot, of one inch thick, weighs $46\frac{51}{100}$ lbs.

Stub's Wire Gauge Nearest No.	Thickness in Decimal Parts of an Inch.	Ounces per Square Foot.	Sheets 14 x 48 in. Weight in Pounds.	Sheets 24 x 48 in. Weight in Pounds.	Sheets 30 x 60 in. Weight in Pounds.	Sheets 36 x 72 in. Weight in Pounds.	Sheets 48 x 72 in. Weight in Pounds.
35	.00537	4	1.16	2	3.12	4.50	6
33	.00806	6	1.75	3	4.68	6.75	9
31	.0107	8	2.33	4	6.25	9	12
28	.0134	10	2.91	5	7.81	11.25	15
27	.0161	12	3.50	6	9.37	13.50	18
26	.0188	14	4.08	7	10.93	15.75	21
25	.0215	16	4.66	8	12.50	18	24
24	.0242	18	5.25	9	14.06	20.25	27
22	.0269	20	5.83	10	15.62	22.50	30
21	.0322	24	7	12	18.75	27	36
19	.0430	32	9.33	16	25	36	48
18	.0538	40	11.66	20	31.25	45	60
16	.0645	48	14	24	37.50	54	72
15	.0754	56	16.33	28	43.75	63	84
14	.0860	64	18.66	32	50	72	96
13	.095	70	.....	35	55	79	105
12	.109	81	.....	40	63	91	122
11	.120	89	.....	44	70	100	134
10	.134	100	.....	50	78	112	150
9	.148	110	.....	55	86	124	165
8	.165	123	.....	61	96	138	184
7	.180	134	.....	67	105	151	201
6	.203	151	.....	75	118	170	227
5	.220	164	.....	82	128	184	246
4	.238	177	.....	88	138	199	266
3	.259	193	.....	96	151	217	289
2	.284	211	.....	105	165	238	317
1	.300	223	.....	111	174	251	335
0	.340	253	.....	126	198	285	380

The weights given in foregoing table, while approximately correct, are not guaranteed.

SHEET ZINC.

Table Showing Zinc Gauge as Compared with Other Gauges.

Zinc Gauge.			American or Brown & Sharpe.		Birmingham or Stubs.		United States Standard.	
No.	Square Foot in Lbs.	Thick- ness in Inches.	No.	Approx- imate Thickness in Inches.	No.	Approx- imate Thickness in Inches.	No.	Approx- imate Thickness in Inches.
3	.22	.006	34	.0063	35	.005	33	.0062
.....	.....	.....	.....	.....	.....	.....	37	.0066
4	.30	.008	33	.0070	34	.007	36	.0070
.....	.....	.....	32	.0079	33	.008	35	.0078
5	.37	.010	31	.0089	.....	.....	34	.0086
.....	.....	.....	.....	.....	32	.009	33	.0093
6	.45	.012	30	.0100	31	.010	32	.0101
7	.52	.014	29	.0112	30	.012	31	.0109
8	.60	.016	28	.0126	29	.013	30	.0125
.....	.....	.....	27	.0141	28	.014	29	.0140
9	.67	.018	26	.0159	27	.016	28	.0156
10	.75	.020	25	.0179	26	.018	27	.0171
11	.90	.024	24	.0201	25	.020	26	.0187
12	1.05	.028	23	.0225	24	.022	25	.0218
13	1.20	.032	22	.0253	23	.025	24	.0250
14	1.35	.036	21	.0284	22	.028	23	.0281
15	1.50	.040	20	.0319	21	.032	22	.0312
16	1.68	.045	19	.0353	20	.035	21	.0343
17	1.87	.050	18	.0403	.....	.....	20	.0375
18	2.06	.055	17	.0452	19	.042	19	.0437
19	2.25	.060	16	.0508	18	.049	18	.0500
20	2.62	.070	15	.0570	17	.058	17	.0562
21	3.00	.080	14	.0640	16	.065	16	.0625
22	3.37	.090	13	.0719	15	.072	15	.0703
23	3.75	.100	12	.0808	14	.083	14	.0781
24	4.70	.125	11	.0907	13	.095	13	.0937
.....	.....	.....	10	.1018	12	.109	12	.1093
.....	.....	.....	9	.1144	11	.120	11	.1250
.....	.....	.....	8	.1284	10	.134	10	.1406
.....	.....	.....	7	.1442	9	.148	9	.1562
.....	.....	.....	6	.1620	8	.165	8	.1718
.....	.....	.....	5	.1819	7	.180	7	.1875
.....	.....	.....	4	.2043	6	.203	6	.2031
.....	.....	.....	3	.2294	5	.220	5	.2187
.....	.....	.....	.....	.....	4	.238	4	.2343
25	9.40	.250	2	.2576	3	.259	3	.2500
.....	.....	.....	.....	.....	2	.284	2	.2656
.....	.....	.....	1	.2893	1	.300	1	.2812
.....	.....	.....	0	.3249	0	.340	0	.3125
26	14.00	.375	000	.4096	000	.425	000	.3750
27	18.75	.500	.....	.....	.....	.....	0000000	.5000
28	37.50	1.000	.....	.....	.....	.....	.....	.....

Zinc Gauge can be maintained only approximately.

TABLE OF DECIMAL EQUIVALENTS.

8ths.

$\frac{1}{8}$ equals.....	.125	$\frac{5}{8}$ equals.....	.625
$\frac{2}{8}$ ".....	.250	$\frac{6}{8}$ ".....	.750
$\frac{3}{8}$ ".....	.375	$\frac{7}{8}$ ".....	.875
$\frac{4}{8}$ ".....	.500		

16ths.

$\frac{1}{16}$ equals.....	.0625	$\frac{11}{16}$ equals.....	.6875
$\frac{2}{16}$ ".....	.1250	$\frac{12}{16}$ ".....	.7500
$\frac{3}{16}$ ".....	.1875	$\frac{13}{16}$ ".....	.8125
$\frac{4}{16}$ ".....	.2500	$\frac{14}{16}$ ".....	.8750

32ds.

$\frac{1}{32}$ equals.....	.03125	$\frac{17}{32}$ equals.....	.53125
$\frac{2}{32}$ ".....	.06250	$\frac{18}{32}$ ".....	.56250
$\frac{3}{32}$ ".....	.09375	$\frac{19}{32}$ ".....	.59375
$\frac{4}{32}$ ".....	.12500	$\frac{20}{32}$ ".....	.62500
$\frac{5}{32}$ ".....	.15625	$\frac{21}{32}$ ".....	.65625
$\frac{6}{32}$ ".....	.18750	$\frac{22}{32}$ ".....	.68750
$\frac{7}{32}$ ".....	.21875	$\frac{23}{32}$ ".....	.71875
$\frac{8}{32}$ ".....	.25000	$\frac{24}{32}$ ".....	.75000
$\frac{9}{32}$ ".....	.28125	$\frac{25}{32}$ ".....	.78125
$\frac{10}{32}$ ".....	.31250	$\frac{26}{32}$ ".....	.81250
$\frac{11}{32}$ ".....	.34375	$\frac{27}{32}$ ".....	.84375
$\frac{12}{32}$ ".....	.37500	$\frac{28}{32}$ ".....	.87500
$\frac{13}{32}$ ".....	.40625	$\frac{29}{32}$ ".....	.90625
$\frac{14}{32}$ ".....	.43750	$\frac{30}{32}$ ".....	.93750
$\frac{15}{32}$ ".....	.46875	$\frac{31}{32}$ ".....	.96875

64ths.

$\frac{1}{64}$ equals.....	.015625	$\frac{17}{64}$ equals.....	.515625
$\frac{2}{64}$ ".....	.031250	$\frac{18}{64}$ ".....	.546875
$\frac{3}{64}$ ".....	.046875	$\frac{19}{64}$ ".....	.578125
$\frac{4}{64}$ ".....	.062500	$\frac{20}{64}$ ".....	.609375
$\frac{5}{64}$ ".....	.078125	$\frac{21}{64}$ ".....	.640625
$\frac{6}{64}$ ".....	.109375	$\frac{22}{64}$ ".....	.671875
$\frac{7}{64}$ ".....	.140625	$\frac{23}{64}$ ".....	.703125
$\frac{8}{64}$ ".....	.171875	$\frac{24}{64}$ ".....	.734375
$\frac{9}{64}$ ".....	.203125	$\frac{25}{64}$ ".....	.765625
$\frac{10}{64}$ ".....	.234375	$\frac{26}{64}$ ".....	.796875
$\frac{11}{64}$ ".....	.265625	$\frac{27}{64}$ ".....	.828125
$\frac{12}{64}$ ".....	.296875	$\frac{28}{64}$ ".....	.859375
$\frac{13}{64}$ ".....	.328125	$\frac{29}{64}$ ".....	.890625
$\frac{14}{64}$ ".....	.359375	$\frac{30}{64}$ ".....	.921875
$\frac{15}{64}$ ".....	.390625	$\frac{31}{64}$ ".....	.953125
$\frac{16}{64}$ ".....	.421875		.984375
$\frac{17}{64}$ ".....	.453125		
$\frac{18}{64}$ ".....	.484375		


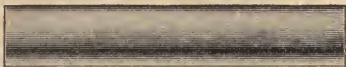

















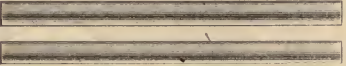

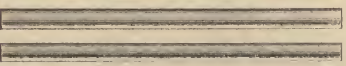



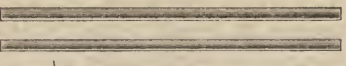

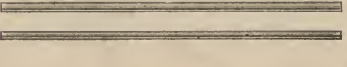


TABLE SHOWING THE DIFFERENCE BETWEEN WIRE GAUGES.

No.	Old English or London.	Stubs or Birmingham.	Brown & Sharpe's.
0000.....	.454	.454	.460
000.....	.425	.425	.40964
00.....	.380	.380	.36480
0.....	.340	.340	.32486
1.....	.300	.300	.28930
2.....	.284	.284	.25763
3.....	.259	.259	.22942
4.....	.238	.238	.20431
5.....	.220	.220	.18194
6.....	.203	.203	.16202
7.....	.180	.180	.14428
8.....	.165	.165	.12849
9.....	.148	.148	.11443
10.....	.134	.134	.10189
11.....	.120	.120	.090742
12.....	.109	.109	.080808
13.....	.095	.095	.071961
14.....	.083	.083	.064087
15.....	.072	.072	.057068
16.....	.065	.065	.05082
17.....	.058	.058	.045257
18.....	.049	.049	.040303
19.....	.040	.042	.03589
20.....	.035	.035	.031961
21.....	.0315	.032	.028462
22.....	.0295	.028	.025347
23.....	.027	.025	.022571
24.....	.025	.022	.0201
25.....	.023	.020	.0179
26.....	.0205	.018	.01594
27.....	.01875	.016	.014195
28.....	.0165	.014	.012641
29.....	.0155	.013	.011257
30.....	.01375	.012	.010025
31.....	.01225	.010	.008928
32.....	.01125	.009	.00795
33.....	.01025	.008	.00708
34.....	.0095	.007	.006304
35.....	.009	.005	.005614
36.....	.0075	.004	.005
37.....	.0065	.....	.004453
38.....	.00575	.....	.003965
39.....	.005	.....	.003531
40.....	.0045	.....	.003144

WIRE GAUGES IN INCHES.

No.	Stubs'.	Nos. 0 and 1.	Brown & Sharpe's.
1.....	$\frac{5}{16}$ inch.	.....	$\frac{5}{16}$ inch.
3.....	$\frac{1}{4}$ "	2.....	$\frac{1}{4}$ "
7.....	$\frac{3}{16}$ "	5.....	$\frac{3}{16}$ "
11.....	$\frac{1}{8}$ "	8.....	$\frac{1}{8}$ "
16.....	$\frac{1}{16}$ "	14.....	$\frac{1}{16}$ "
21.....	$\frac{3}{32}$ "	20.....	$\frac{3}{32}$ "

CUT ILLUSTRATING THE ACTUAL SIZE OF WIRE AND APPROXIMATE SIZE IN INCHES.

No. 0			$\frac{1}{16}$
No. 1			$\frac{3}{32}$
No. 2			
No. 3			$\frac{1}{4}$
No. 4			$\frac{7}{32}$
No. 5			$\frac{11}{32}$
No. 6			$\frac{1}{8}$
No. 7			
No. 8			$\frac{5}{32}$
No. 9			
No. 10			
No. 11			$\frac{1}{8}$
No. 12			
No. 13			$\frac{3}{32}$
No. 14			
No. 15			
No. 16			$\frac{1}{16}$
No. 17			
No. 18			
No. 19			
No. 20			$\frac{1}{32}$

RAILWAY CURVES.

(From the Roadmaster's Assistant.)

To Find the Degree or Radius of a Curve.

Stretch taut a 50 foot tape line on the inner side of the rail, and measure the perpendicular distance (which is the "middle ordinate") from the center of the tape line to the inner edge of the rail.

The radius and degree of the curve corresponding to this middle ordinate may then be found in the following table.

Degree.	Radius in Feet.	Middle Ordinate in Inches.
30'	11,490	.22
1°	5,730	.66
2°	2,865	1.32
3°	1,910	1.97
4°	1,433	2.63
5°	1,146	3.28
6°	955	3.94
7°	819	4.57
8°	717	5.24
9°	637	5.89
10°	574	6.54
11°	522	7.20
12°	478	7.87
13°	442	8.51
14°	410	9.17
15°	383	9.80
16°	359	10.49
17°	338	11.11
18°	320	11.78
19°	303	12.41
20°	288	13.06

To Ascertain the Radius Corresponding to any Degree.

Divide 5,730 (the radius of a 1° curve) by the degree of the curve under consideration. For example:

Radius of a 5° curve = $5730 / 5 = 1,146$.

To Determine the Elevation of the Outer Rail on Curves.

Stretch a line between two points 54 feet apart, on the running side of the outer rail, and the distance from the center of this line to the rail will give the elevation required.

TABLE FOR THE ELEVATION OF THE OUTER RAIL ON CURVES.

The following table, calculated by a prominent civil engineer, is intended to serve for the principle gauge used in this country, viz.: 4 feet 8½ inches. The proper elevation is calculated for nine different speeds, from 15 to 60 miles an hour, and for curves from 30 minutes to 35 degrees radius.

Degree of Curva- ture.	Rate of Speed in Miles per Hour.								
	15	20	25	30	35	40	45	50	60
	In.	In.	In.	In.	In.	In.	In.	In.	In.
30'.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$
1° 00'.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{3}{8}$
1° 30'.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	2	$2\frac{1}{8}$	$3\frac{1}{8}$
2° 00'.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$
2° 30'.....	$\frac{1}{8}$	$\frac{1}{4}$	1	$1\frac{1}{8}$	2	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$
3° 00'.....	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	7
3° 30'.....	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$8\frac{1}{8}$
4° 00'.....	$\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$9\frac{1}{8}$
4° 30'.....	$\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	3	$3\frac{1}{8}$	$4\frac{1}{8}$	6	$7\frac{1}{8}$	$10\frac{1}{8}$
5° 00'.....	$\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$	3	4	$5\frac{1}{8}$	$6\frac{1}{8}$	$8\frac{1}{8}$	$11\frac{1}{8}$
6° 00'.....	1	$1\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$6\frac{1}{8}$	8	$9\frac{1}{8}$	$14\frac{1}{8}$
7° 00'.....	1	$2\frac{1}{8}$	$2\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$7\frac{1}{8}$	$9\frac{1}{8}$	$11\frac{1}{8}$	$16\frac{1}{8}$
8° 00'.....	$1\frac{3}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$6\frac{1}{8}$	$8\frac{1}{8}$	$10\frac{1}{8}$	$13\frac{1}{8}$	$18\frac{1}{8}$
9° 00'.....	$1\frac{3}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$5\frac{1}{8}$	$7\frac{1}{8}$	$9\frac{1}{8}$	$11\frac{1}{8}$	$14\frac{1}{8}$	$21\frac{1}{8}$
10° 00'.....	$1\frac{3}{8}$	$2\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	8	$10\frac{1}{8}$	$13\frac{1}{8}$	$16\frac{1}{8}$	$23\frac{1}{8}$
12° 00'.....	$1\frac{3}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$7\frac{1}{8}$	.....	.....	.....	.....	.....
15° 00'.....	$2\frac{1}{8}$	$3\frac{1}{8}$	$6\frac{1}{8}$	$9\frac{1}{8}$	.....	.....	.....	.....	.....
18° 00'.....	$2\frac{1}{8}$	$4\frac{1}{8}$	$7\frac{1}{8}$	$10\frac{1}{8}$	.....	.....	.....	.....	.....
20° 00'.....	$2\frac{1}{8}$	$5\frac{1}{8}$	$8\frac{1}{8}$	$11\frac{1}{8}$	.....	.....	.....	.....	.....
25° 00'.....	$3\frac{1}{8}$	$6\frac{1}{8}$	$10\frac{1}{8}$	$15\frac{1}{8}$	.....	.....	.....	.....	.....
30° 00'.....	$4\frac{1}{8}$	$7\frac{1}{8}$	$12\frac{1}{8}$	$17\frac{1}{8}$	.....	.....	.....	.....	.....
35° 00'.....	$5\frac{1}{8}$	$9\frac{1}{8}$	$14\frac{1}{8}$	$20\frac{1}{8}$	.....	.....	.....	.....	.....

TO FIND THE ANGLE OF A FROG REQUIRED FOR ANY TURNOUT.

Lay out the line A B, find where it measures 8 inches from the running side of main rail after crossing it, mark that point and measure the distance from there to where it intersects the running side of the main rail, and divide the distance by the 8 inches, the result will be the angle of frog. For example, suppose the line A B to be 8 inches from main rail at a point 60 inches from the point of intersection, then 60 divided by 8 equals 7½. Frog required is No. 7½ or 1 to 7½.

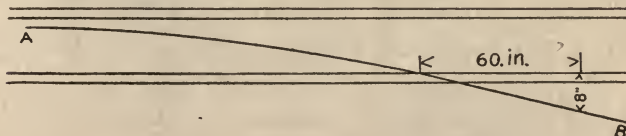


TABLE OF MIDDLE ORDINATES FOR BENDING RAILS TO BE LAID ON CURVES.

(From the Roadmaster's Assistant.)

Deflection Angle.	Radius.	Length of Rails in Feet.										
		30	28	26	24	22	20	18	16	14	12	10
Deg	Feet.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
.5	11,460	.120	.096	.072	.060	.048	.048	.036	.024	.024	.012	.012
1.	5,730	.240	.192	.156	.132	.108	.096	.072	.060	.048	.036	.024
1.5	3,820	.348	.312	.252	.216	.192	.156	.120	.096	.072	.048	.036
2.	2,865	.456	.408	.348	.300	.252	.204	.168	.132	.096	.072	.048
2.5	2,292	.588	.516	.444	.372	.324	.264	.216	.168	.120	.084	.060
3.	1,910	.696	.612	.528	.444	.372	.312	.264	.204	.144	.108	.072
3.5	1,637	.840	.732	.624	.516	.444	.372	.300	.240	.180	.132	.096
4.	1,433	.948	.828	.720	.600	.504	.420	.348	.276	.216	.156	.108
4.5	1,274	1.056	.924	.804	.672	.564	.468	.384	.312	.240	.180	.120
5.	1,146	1.188	1.032	.888	.756	.636	.528	.420	.348	.264	.192	.132
5.5	1,042	1.296	1.128	.984	.840	.708	.576	.468	.384	.288	.216	.144
6.	955.4	1.404	1.224	1.056	.912	.768	.624	.504	.408	.312	.228	.156
6.5	882	1.536	1.344	1.164	.984	.828	.684	.552	.444	.336	.252	.168
7.	819	1.644	1.440	1.248	1.056	.888	.732	.588	.468	.360	.264	.180
7.5	764.5	1.752	1.524	1.332	1.128	.948	.780	.636	.504	.384	.288	.192
8.	716.8	1.896	1.644	1.428	1.200	1.020	.840	.672	.540	.408	.300	.204
8.5	674.6	1.992	1.740	1.512	1.272	1.080	.888	.720	.576	.432	.324	.216
9.	637.3	2.100	1.836	1.596	1.344	1.140	.936	.756	.600	.456	.348	.228
9.5	603.8	2.244	1.956	1.692	1.428	1.212	.996	.804	.648	.504	.372	.252
10.	573.7	2.352	2.052	1.776	1.500	1.272	1.044	.852	.684	.540	.384	.264
11.	521.7	2.592	2.256	1.956	1.668	1.404	1.152	.936	.756	.568	.432	.288
12.	478.3	2.832	2.472	2.148	1.812	1.536	1.260	1.020	.828	.636	.468	.312
13.	441.7	3.048	2.664	2.304	1.956	1.656	1.356	1.104	.900	.684	.504	.336
14.	410.3	3.300	2.868	2.484	2.100	1.776	1.464	1.188	.960	.732	.540	.360
15.	383.1	3.540	3.084	2.676	2.256	1.908	1.572	1.272	1.020	.780	.588	.396
16.	359.3	3.756	3.276	2.832	2.400	2.040	1.668	1.356	1.092	.840	.624	.420
17.	338.3	3.996	3.480	3.024	2.556	2.160	1.776	1.440	1.152	.888	.660	.444
18.	319.6	4.212	3.672	3.180	2.700	2.280	1.872	1.524	1.224	.936	.696	.468
19.	302.9	4.452	3.888	3.360	2.856	2.412	1.980	1.608	1.296	.984	.732	.492
20.	287.9	4.704	4.092	3.552	3.000	2.544	2.088	1.692	1.368	1.044	.792	.528

NOTE.—This table is slightly modified in form from that prepared by Mr. John C. Trautwine for his "Civil Engineers' Pocket Book."

TO FIND THE ANGLE OF A FROG.



Divide the distance A B by the sum of the distances C D and E F. For example, suppose A B to equal 72 inches, C D 8 inches, and E F 4 inches; then 72 divided by 12 equals 6. Angle and spread of frog is 1 in 6.

TABLE FOR PUTTING IN FROGS AND SWITCHES.

Proportion of Frog.	Length of Frog.	Angle of Frog.	Radius of Curve.	Distance from Head Block to Point of Frog.	Crotch Frog.		
					Proportion of Frog.	Length of Frog.	Distance from Head Block to Point of Frog
1 to 4	5 Ft.	14° 15'	165 Ft.	28 Ft.	1 to 3	4 Ft.	17 Ft.
1 " 5	5 "	11° 25'	254 "	35 "	1 " 3½	4 "	21 "
1 " 6	6 "	9° 32'	365 "	42 "	1 " 4½	5 "	25 "
1 " 7	7 "	8° 10'	566 "	48 "	1 " 5	5 "	28 "
1 " 8	8 "	7° 09'	642 "	57 "	1 " 5½	5 " 8 In.	34 "
1 " 9	9 "	6° 21'	811 "	64 "	1 " 6½	6 " 4 "	38 "
1 " 10	10 "	5° 44'	1005 "	71 "	1 " 7	7 "	41 "
1 " 11	11 "	5° 12'	1210 "	78 "	1 " 7½	7 " 8 "	45 "
1 " 12	12 "	4° 46'	1400 "	86 "	1 " 8½	8 " 4 "	50 "
					Gauge 5 feet. 5-inch throw.		
1 " 4	5 "	14° 15'	155 "	26 "	1 " 3	4 "	16 "
1 " 5	5 "	11° 25'	239 "	32 "	1 " 3½	4 "	20 "
1 " 6	6 "	9° 32'	345 "	39 "	1 " 4½	5 "	23 "
1 " 7	7 "	8° 10'	431 "	46 "	1 " 5	5 "	28 "
1 " 8	8 "	7° 09'	606 "	52 "	1 " 5½	5 " 8 "	31 "
1 " 9	9 "	6° 21'	764 "	59 "	1 " 6½	6 " 4 "	35 "
1 " 10	10 "	5° 44'	979 "	65 "	1 " 7	7 "	37 "
1 " 11	11 "	5° 12'	1096 "	73 "	1 " 7½	7 " 8 "	42 "
1 " 12	12 "	4° 46'	1246 "	80 "	1 " 8½	8 " 4 "	46 "
					Gauge 4' 8½ in. 5-inch throw.		
1 " 4	4 "	14° 15'	102 "	14 "	1 " 3	4 "	8 "
1 " 5	5 "	11° 25'	154 "	19 "	1 " 3½	4 "	11 "
1 " 6	6 "	9° 32'	220 "	23 "	1 " 4½	5 "	13 "
1 " 7	7 "	8° 10'	296 "	27 "	1 " 5	5 "	15 "
1 " 8	8 "	7° 09'	388 "	32 "	1 " 5½	5 "	18 "
1 " 9	9 "	6° 21'	486 "	36 "	1 " 6½	6 "	20 "
1 " 10	10 "	5° 44'	606 "	41 "	1 " 7	7 "	22 "
1 " 11	11 "	5° 12'	732 "	45 "	1 " 7½	7 "	25 "
1 " 12	12 "	4° 46'	966 "	50 "	1 " 8½	8 "	27 "
					Gauge 3 feet. 5-inch throw.		

For split switch, place heel of switch same distance from point of frog as head block.

8 feet switch points are suitable for frogs 1 to 4, 1 to 5, or 1 to 6.

10 " " " " " " " 1 to 7, 1 to 8, or 1 to 9.

15 " " " " " " " 1 to 10, 1 to 11, or 1 to 12.

SWITCHES AND FROGS.

Rules for the Use of Roadmasters.

(By D. H. Lovell, C. E. From "The Official Railway List.")

Split Switches.

The rule for the theoretical lead of a split switch for any gauge is: Twice the gauge of the track multiplied by the number or proportion of the frog; or, for 4 ft. 8½ in. and 4 ft. 9 in. gauges the lead is 9½ times number of frog, and for 5 ft. gauge 10 times number of frog.

Theoretical Leads.

3 Ft. Gauge.		4 Ft. 8½ In. Gauge.		4 Ft. 9 In. Gauge.		5 Ft. Gauge.	
No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.
	Ft.		Ft. In.		Ft. In.		Ft.
4.....	24	6.....	56 6	6.....	57 0	6.....	60
5.....	30	7.....	65 11	7.....	66 6	7.....	70
6.....	36	8.....	75 4	8.....	76 0	8.....	80
7.....	42	9.....	84 9	9.....	85 6	9.....	90
8.....	48	10.....	94 2	10.....	95 0	10.....	100
9.....	54	11.....	103 7	11.....	104 6	11.....	110
10.....	60	12.....	113 0	12.....	114 0	12.....	120
11.....	66	15.....	141 3	15.....	142 6	15.....	150

In practice the above are found to be too long. For shortened leads, which will be found to work well in practice, the following rule is given: For 4 ft. 8½ in. and 4 ft. 9 in. gauges the lead for all the frogs up to and including a No. 6 is 9½ times No. of frog; for Nos. 7 and 8, 9 times No. of frog; for Nos. 9 and 10, 8½ times No. of frog; and for all above No. 10, 8 times No. of frog.

For 5 ft. gauge add ½ to each of the preceding multipliers. No. 6 multiplied by 9½ will then be No. 6 multiplied by 10 equals 60 ft., which is the lead for No. 6 frog and 5 ft. gauge.

Shortened Leads.

4 Ft. 8½ In. and 4 Ft. 9 In. Gauges.				5 Feet Gauge.			
No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.
6x9½.....	= 57' 0"	10x8½.....	= 85'	6x10.....	= 60' 0"	10x9.....	= 90' 0"
7x9.....	= 63' 0"	11x8.....	= 88'	7x9½.....	= 66' 6"	11x8½.....	= 93' 6"
8x9.....	= 72' 0"	12x8.....	= 96'	8x9½.....	= 76' 0"	12x8½.....	= 102' 0"
9x8½.....	= 76' 6"	15x8.....	= 120'	9x9.....	= 81' 0"	15x8½.....	= 127' 6"

The above shortened leads may be varied from when it is expedient to do so to avoid waste of rail by cutting or to suit the material.

STUB SWITCHES.

The lead for a stub switch for 4 feet $8\frac{1}{2}$ inch and 4 feet, 9 inch gauges is $6\frac{1}{2}$ (6.75) times number of frog for 5 inch throw, and $6\frac{1}{2}$ (6.5) times number of frog for $5\frac{1}{2}$ inch throw. For 5 feet gauge and 5 inch or $5\frac{1}{2}$ inch throw the lead is 7 times number of frog. The stub lead should not be shortened; it and the length of switch rail should be equal, or nearly so, to the full theoretical lead.

5 Inch Throw.		$5\frac{1}{2}$ Inch Throw.		5 and $5\frac{1}{2}$ Inch Throw	
4 feet $8\frac{1}{2}$ inch and 4 feet 9 inch Gauges.		4 feet $8\frac{1}{2}$ inch and 4 feet 9 inch Gauges		5 foot Gauge.	
No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.
$6 \times 6\frac{1}{2}$	= 40' 6"	$6 \times 6\frac{1}{2}$	= 39' 0"	6×7	= 42'
$7 \times 6\frac{1}{2}$	= 47' 4"	$7 \times 6\frac{1}{2}$	= 45' 6"	7×7	= 49'
$8 \times 6\frac{1}{2}$	= 54'	$8 \times 6\frac{1}{2}$	= 52'	8×7	= 56'
$9 \times 6\frac{1}{2}$	= 60' 9"	$9 \times 6\frac{1}{2}$	= 58' 6"	9×7	= 63'
$10 \times 6\frac{1}{2}$	= 67' 6"	$10 \times 6\frac{1}{2}$	= 65'	10×7	= 70'

For Length of Moving Rail—Stub Switch.

For 4 feet $8\frac{1}{2}$ inch and 4 feet 9 inch gauges and 5 inch throw the length of moving rail is $2\frac{1}{2}$ (2.75) times No. of frog. For 4 feet $8\frac{1}{2}$ inch and 4 feet 9 inch gauges and $5\frac{1}{2}$ inch throw; and for 5 feet gauge and 5 and $5\frac{1}{2}$ inch throw it is 3 times No. of frog.

4 Feet $8\frac{1}{2}$ Inch and 4 Feet 9 Inch Gauges and 5 Inch Throw.		4 Feet $8\frac{1}{2}$ Inch and 4 Feet 9 Inch Gauges and $5\frac{1}{2}$ Inch Throw.	
5 Feet Gauge and 5 and $5\frac{1}{2}$ Inch Throws.		5 Feet Gauge and 5 and $5\frac{1}{2}$ Inch Throw.	
$2\frac{1}{2}$ (2.75) Times No. of Frog.		3 Times No. of Frog.	
No. Frog.		No. Frog.	
$6 \times 2\frac{1}{2}$	= 16' 6" moving rail.	6×3	= 18' moving rail.
$7 \times 2\frac{1}{2}$	= 19' 3" " "	7×3	= 21' " "
$8 \times 2\frac{1}{2}$	= 22' " "	8×3	= 24' " "
$9 \times 2\frac{1}{2}$	= 24' 9" " "	9×3	= 27' " "
$10 \times 2\frac{1}{2}$	= 27' 6" " "	10×3	= 30' " "

As all the preceding is presented in a way to be intelligible and useful to the trackman, it is hardly to be expected that it will check theoretically, but it will be found to nearly do so.

Crossing Between Parallel Tracks.

From the distance between gauge lines of parallel tracks subtract the gauge of the track; multiply the remainder by the number of the frog, and it will give the distance between the frog points measured along with, not diagonally across, the parallel tracks. The distance between gauge lines to be taken as the distance between the tracks.

Example.—Distance between tracks, 7 feet; 4 feet $8\frac{1}{2}$ inch gauge and No. 10 frog. 7 feet-4 feet $8\frac{1}{2}$ inches = 2 feet $3\frac{1}{2}$ inches. 2 feet $3\frac{1}{2}$ inches \times 10 = 22 feet 11 inches, the distance between frog points.



